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JOURNAL OF THE MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH.

ORGANIZED 1890.

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VOL. XIV. February, 1904. No. 1.

THE MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH was organized in Boston, March, 1890, *with the following objects: the advancement of sanitary science; the promotion of better organization and co-operation among local boards of health, and the uniform enforcement of sanitary laws and regulations.*

THE JOURNAL OF THIS ASSOCIATION has for thirteen years faithfully reflected the views of the public hygienists of Massachusetts. As the only one of its kind in Massachusetts, the Journal has had its own field, which, however, it has not yet fully occupied. With the October issue of the year 1903, *a policy of expansion was adopted. The subscription list showed an immediate and most gratifying increase, so that this, the third issue has a total circulation of over* 1,100 *copies.*

In order that the Journal may appear within the next month after each quarterly meeting of the Association, the date of publication will be FEBRUARY, MAY, AUGUST *and* NOVEMBER *of each year.*

THE JOURNAL will contain the papers read at the meetings of the Association, verbatim reports of the discussions, editorials, abstracts, reviews and hygienic notes of professional interest. Subscription rates, $1.00 *per year. Reprints furnished at cost price.*

All communications concerning the ASSOCIATION should be addressed to the Secretary of the Association, JAMES C. COFFEY, CITY HALL, WORCESTER, MASS.

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EDITORIALS.

THE PHYSIOLOGIST, BAYLISS, *vs.* COLERIDGE, THE ANTIVIVISECTIONIST.

A suit for damages for libel. Judgment for the plaintiff in £2000.

The circumstances of this case should be of interest to all those concerned in the advancement of medical knowledge.

They may be summarized briefly as follows: Two young Swedish women, of good education and social position, had been visiting various laboratories and attending lectures in courses on physiology, apparently with the purpose of securing evidence to be used in propaganda against animal experimentation. During the winter of 1902-1903 they visited London, and in February, 1903, at one of a course of lectures in physiology at University College, they claimed to have witnessed experiments that were conducted with great cruelty and in violation of the law. They were at this lecture—as they had been at others—not as genuine students of physiology, but as seekers after evidence in their crusade against animal experimentation of any kind. They were well educated, and might be supposed to be honest. It would be natural therefore to believe that they could see and understand what went on within a few feet of them, and would take great pains to truthfully report what they saw. They testified that they saw no tube connection made for purposes of artificial respiration; that the animal being experimented upon made many purposive movements, indicating a conscious struggling; that they smelled no anesthetic, and believed that none was given; that cries, whines and barks had been heard, and that the animal had made a shrinking movement, as of fear, at the first approach of the operator.

As against this professedly close and accurate observation, it was proved in Court, before the Lord Chief Justice of England:

(1) that artificial respiration was carried on all the time the animal was on the table in front of them; (2) that the animal was profoundly anesthetized,—one and a half grains of morphia had been injected before it had been brought into the room (a very large dose), and that six ounces of the "A. C. E." mixture (alcohol, chloroform and ether) had been used during the operation; (3) that this particular dog was affected with chorea, and that the movements seen were choreic—not purposive—in character; (4) that tracheotomy had been performed, and it was impossible therefore that any cries, whines or barks could have been heard; (5) that the shrinking movement of fear testified to could not have occurred for the above reasons.

The ladies, relying upon their own powers of observation, made a statement of what they claimed to have seen to Mr. Stephen Coleridge, Honorary Secretary of the Antivivisection Society (of England), a lawyer and a member of the English Bar. This gentleman, as he testified, accepted their statement without any attempt at verification, although he knew that giving publicity to it would be likely to be followed by prosecution. Apparently, however, the search for evidence to support the agitation has grown so desperate that this opponent of animal experimentation was ready, even anxious to use this testimony, and did so, amid great enthusiasm, at the annual meeting of the Antivivisection Society, early in May, 1903.

The prosecution for libel followed promptly, with the substantial verdict against the defendant, already mentioned, of nearly $10,000.

That a lawyer, trained in the weighing of evidence and with a knowledge of the necessary responsibility accompanying specific assertions of cruelty, should have taken no step to verify his supposed facts, seems inexplicable. The defendant gave as his reason that he knew they would be denied, and during cross-examination went so far as to say that he still believed the women to have testified to the truth; this after their statements had all been denied under oath!

Here is the condition of mind we have found much nearer home. The opponents of animal experimentation deny its use-

fulness, in the face of overwhelming evidence to the contrary. Evidence that to them is not such, for they do not believe it when it is stated, and take no pains to verify it by actual observation. It may perhaps be fortunate, after all, that such attempts at verification are not made by such people, if their interpretation of the facts seen by them is to be as false as it was in this instance.

It has not yet happened that specific allegations of cruelty have been made in Massachusetts. Of general assertions there have been many, all of the same character, and repeated year after year. Perhaps such a disastrous failure as that of Mr. Coleridge, in the exploitation of an unsubstantiated calumny, may prove a salutary warning even to the most violent opponents of physiological research and teaching. That simple limitation is not what they desire, but absolute prohibition is becoming more and more evident from year to year.

If the unhampered advance of medical knowledge is to go on, ever watchful care must be taken that methods like those illustrated in this trial are not successful.

Poetic justice sometimes is seen, even in this workaday twentieth century. Dr. Bayliss, on receipt of the money from Mr. Coleridge, turned it over to the laboratory fund for devotion to the furtherance of physiological research!

MR. COLERIDGE IN A NEW ROLE (*Brit. Med. Jour.*, Jan. 2, 1904).—It is not always that one who has suffered bitter defeat as the climax of enthusiastic effort possesses sufficient manliness to give his successful opponents even the most niggardly modicum of respect or credit for decency. Mr. Stephen Coleridge, Honorary Secretary of the Antivivisection Society of England, has gone further than this. Since paying his fine for damages in the case of Bayliss *vs.* Coleridge, he has come to the defense of his late opponents against the unscrupulous attacks of the Secretary of another anti-society, the "National Canine Defense Society." This Secretary published recently a circular containing the usual wild, general statements and emotional

appeals, which forms the stock in trade of those agitators who lack sufficient honesty to tell the truth, and sufficient courage to make specific charges which might be met in court.

Mr. Coleridge took up these charges in detail, refuting them seriatim, and wound up with a much-needed admonition to the author of the circular, pointing out that exaggeration, innuendo and falsehood are not the methods by which success is attained or the respect of decent people secured.

We give below some of these statements and Mr. Coleridge's reply:

Secretary of the "National Canine Defense Society":	Secretary of the Anti-vivisection Society:
"Thousands of dogs are tortured annually by licensed experimenters."	"If every animal experimented on in 1902 (under the various licenses) were a dog, the total would not come to thousands.
"The total number of experiments performed in 1902 was 14,906, 12,776 of which were without anesthetics.	"The 12,776 experiments without anesthetics were inoculations or similar simple experiments.
"The number 14,906 does not give the number of dogs used, for each experiment may include any number of dogs."	"The figure 14,906 included all the animals used, frogs, guinea pig, cats, etc., the animals used are not without limit, but less than the actual number returned."

Mr. Coleridge further states that the circular contains "grossly false and misleading statements." He denounces "the false statements of anti-vivisectionists," and rebukes them for "methods which must bring disaster to any movement that employs them, and justly alienate the sympathies of all honorable people."

This is a striking statement, coming from a leader in the anti-vivisection movement, against the whole policy of those whose protestations, training and associations would lead the uninitiated to believe them highly honorable, scrupulously truthful and entirely trustworthy.

THE EFFICIENCY OF PUBLIC PROPHYLAXIS AGAINST TUBERCULOSIS.—Dr. Thomas J. Mays, in a recent article in the *New York and Philadelphia Medical Journal*, attempts to question the efficacy of registration and disinfection as a means of preventing consumption. He presents a great mass of statistics which are analyzed and compared in various ways. He admits that there has been a greater decrease of phthisis in what he terms prevention localities than in non-prevention localities, and that this by itself might be regarded as proof of the efficacy of the methods in question. But he attempts to show that in prevention localities there has been a more than counterbalancing increase of pneumonia, and that while the latter disease has increased in non-prevention localities, the increase is not nearly so marked. While he does not definitely so state, he apparently intends his readers to infer that physicians in their returns of death have of late years erroneously reported deaths from consumption as due to pneumonia. This substitution of pneumonia for tuberculosis he seems to believe is the cause of the comparatively greater increase of pneumonia in localities where the attempt is made to restrict tuberculosis than in localities where such attempt is not made. Asserting this interchange of terms, the author infers that the apparent decrease of consumption which he says is greater in his prevention areas, is not real, and that there is, therefore, no sufficient evidence that registration and disinfection are successful in controlling this disease.

That there should have been a progressive error during the last decade or so, in the diagnosis of these two diseases is incredible. The only other hypothesis is that physicians have falsely substituted one term for the other and have done so to a greater extent in prevention localities than in the non-prevention.

That such substitution is occasionally made to cheat the insurance companies no one doubts, but it can scarcely be often enough to affect the ratios. That physicians should deliberately substitute pneumonia for consumption in their returns of death, for the purpose of deceiving the health department, could only be due to the fear that some grievous burden would be laid upon the family. After the death of the patient about the only trouble that could

be made for the family by the health department would be disinfection, and it is absurd to suppose that fear of this would lead physicians to falsify returns. It will be noticed, too, that in some of the cities referred to as illustrating the pseudo-increase of pneumonia, disinfection after consumption is not compulsory. Thus in 1902, in Baltimore it was practiced after only 76 of the 1,159 deaths from pulmonary tuberculosis. Most of those who are familiar with the subject differ entirely from Dr. Mays, and have no doubt that there has been a very real increase in pneumonia mortality during the last few years. Much of this is due to influenza, but whether all of the increase is due to this cause is not certain. Dr. Mays admits that influenza in the early nineties did increase the amount of pneumonia, but claims that its influence is no longer felt. This, however, is not the fact, for the death returns from Boston, New York, Philadelphia, Baltimore and many other cities show that influenza has prevailed very extensively during the last few years, though indeed rather less in 1902 than formerly. And certainly, the medical practitioners in these cities know that the cases of this disease have been very numerous. We can be very sure that pneumonia has really increased, and that some of this increase has been due to influenza. There is little likelihood that there has been any but a slight transference of consumption to pneumonia. And there can be no doubt that the alleged decrease of pulmonary tuberculosis is real.

In the article referred to, localities which have "agitated" the subjects of notification and disinfection are placed in the same category with those in which these methods are actually practiced. How the mere agitation of those subjects has anything to do with the case is difficult to see. Doubtless discussion of the nature of tuberculosis and the methods of prevention has done something to cause physicians and patients to recommend and adopt reasonable, and more or less effectual methods of restricting infection. Such discussion has been very general and it would be difficult to find a city of considerable size in which these subjects have not been pretty well agitated. All this is very different from the adoption of the official restrictive measures of notification and disinfection. If the value of these methods

is to be questioned, only those places should be considered in which they are actually in force. It is indeed difficult to understand Dr. Mays' selection of prevention and non-prevention localities. Thus, he includes among the former Chicago, where scarcely any cases are reported, Philadelphia, where a notification ordinance was recently adopted, but where no attempt is made to enforce it, andwhere disinfection is entirely voluntary, and Cleveland, Hartford and New Haven, where neither reports of cases nor disinfection was required, at least as late as 1902. Baltimore and the District of Columbia are contrasted as prevention and non-prevention localities, but in neither city are registration or disinfection compulsory. Thus, in the District of Columbiaa, prevention area, for the year ending June 30, 1902, disinfection was practiced after 92 out of 721 deaths, and in Baltimore, a prevention area, in 1902, after only 76 out of 1,159 deaths. The same contrast is made between New Jersey and Rhode Island, but as a matter of fact the methods in question have not been adopted in any of the principal cities of the former state so that New Jersey is no more a prevention state than Rhode Island, It is true that in the prevention localities of Boston, Worcester and Louisville notification is required, but in Boston it dates only from 1901, in Worcester from 1902, and in Louisville from 1903, far too recently to have had any effect whatever. In order to make good the argument, it should have been shown first that a large number of deaths which a few years ago would have been truly reported as consumption, are now erroneously reported as pneumonia. For this there is no evidence whatever. For the second part of the argument, it is necessary to sharply contrast prevention with non-prevention areas. This has not been done, but Dr. Mays apparently arranges the cities of the country into two groups to fit his argument, instead of basing his argument on the facts as they really are. As his premises are thus seen to be faulty, his discussion of the official methods for restricting consumption now in vogue affords no demonstration whatever of their value or worthlessness. The only cities in which compulsory registration and disinfection have been enforced for a sufficient length of time to make their experience of any

value, are New York City and Buffalo. In both of these cities the restrictive measures have been fairly well carried out, for nearly ten years.

At first thought it might be considered useful to compare the rate of decrease of consumption in these two cities with the rate of decrease in those in which restrictive measures have not been promoted by official action. But if the charts in Dr. Mays' article be examined, it will be seen that the death rate from consumption has for a long period varied much in different cities. A part of this difference may in some cities be due to defective registration, but much of it is certainly dependent upon the varying distribution of population, according to sex, age, race, nationality, occupation, etc. Thus the Federal Census of 1890 shows that in New York City the death rate from consumption varied from 646 per 100,000 among those born of Irish mothers, to 98 among those of Polish and Russian parentage, while the rate for the colored population was 774. In properly comparing the death rates in different cities, the errors due to variations in the composition of the population must be corrected. Unless this is done, such comparison is puerile and valueless. Another method of examining this question is to compare the death rate in the cities enforcing notification and disinfection before and after the adoption of these measures. An examination of the New York and Buffalo charts, as shown in Dr. Mays' article, indicates that in these cities consumption has not decreased any more rapidly since the adoption of these methods than before. In fact, in New York (Manhattan and the Bronx) the decrease has been less. Thus, while the rate per 100,000 living was 392 in the six years ending May 31, 1890, for the five years, 1891–1895, it was 291, showing a decrease of 101. During the next five years, during which the notification of the disease was well carried out, it was 255, giving a decrease of 46 (much less a decrease than in the preceding period), while in the three years, 1901–1903, the decrease was only 14 per 100,000 less. We must not, however, be led by this to conclude that registration and disinfection as carried out in New York are harmful, or even worthless. It is rash to draw conclusions from crude death rates, particularly when

for other reasons such conclusions seem unlikely to be correct. Too many things may alter the death rate from a given disease during a period of years, to warrant attributing the change to any one factor, unless good reasons therefor can be shown. The registration of cases of consumption, and the instruction of the patient which should follow, are such rational measures, and if properly managed, are accompanied by so little friction, that they should not be abandoned, or their efficacy even seriously questioned because the death rate from this disease in the few cities in which these measures have been tried does not show results that are plainly favorable. We should persist in the experiment of restricting this disease until more data are available, or at least until the data at hand have been more carefully studied. Certainly, Dr. Mays' presentation of the subject has thrown no light upon it.

THE TYPHOID FEVER EPIDEMIC AT BUTLER, PA.—Butler, a rapidly growing manufacturing city, with a population of about 18,000, is at present recovering from the effects of the most serious municipal epidemic on record, about one person in thirteen having had the disease.

The epidemic was investigated by George A. Soper, Ph.D.* who traced the epidemic to the local water-supply.

"Owing to the failure of a dam, the water had been drawn since last August from Connoquenessing Creek at a point where it was obviously polluted. The supply had been filtered until October 20th by filters designed primarily to perfect the appearance of the water only. On that date the filters were shut down until a pipe connection could be made between some new pumps and the basin for filtered water."

The filters were out of service from October 20th to 31st. The epidemic broke out November 2d, and was continued into the new year, largely, it is believed, through secondary infection. By the third week in November the situation became alarming, and on November 29th the citizens held a mass meeting, organized

Engineering News, Dec. 24, 1903.

relief work, and took the control of the sanitary situation into their own hands.

The work was overwhelming, and on December 16th an appeal was made for outside help. Contributions of money and, on the part of physicians and nurses, of services were made. Hospitals were improvised, and the committee also undertook the executive and statistical work, which the local Board of Health did not perform with any degree of reliability. The Board of Health held a few impotent meetings, as evidenced by the fact that on December 17th their records showed only about 15 per cent. of the then existing cases. The physicians at Butler were never compelled to report their cases. Why should they, when they were so busy? (!) It is stated that no warning notices were posted while the filters were out of service. This should have been the minimum precaution.

About the first of December the State Board of Health came on the scene and assumed responsibility for the sanitary control of the city. After investigation, the Board took such measures as would tend to prevent secondary infection; it distributed the customary disinfectants, not patented disinfectants as has been reported, and instructed the people in their use. It worked in accord with the relief committee.

The epidemic is a stern and severe arraignment of the wealthy state of Pennsylvania, her legislature, her people and her boards of health. Vital statistics are there none worthy of the name; neither is there any adequate sanitary supervision of the water-supplies of the state. For twenty years Secretary Lee has urged the Legislature to make more liberal appropriations for the work of the State Board of Health, but even such epidemics as those which have occurred in Plymouth and Philadelphia, and are occurring in other places to-day, evidently have not awakened the public or the governmental mind.

The following table, showing the number of deaths by typhoid fever per 100,000 population in some of the principal Massachusetts and Pennsylvania cities, is an illustration of what may be accomplished by skill and a moderate expenditure of money, backed by intelligent public sentiment:

AVERAGE TYPHOID FEVER DEATH RATES.

(1898, 1899 and 1900,—Fuller.)

Pennsylvania.		Massachusetts.	
City.	Death Rate.	City.	Death Rate.
Pittsburg	108	Boston	30
Allegheny	86	New Bedford	30
Johnstown	83	Springfield	26
York	83	Lawrence	25
Chester	64	Taunton	25
Lancaster	59	Brockton	24
Philadelphia	54	Chelsea	24
MacKeesport	53	Salem	23
Reading	50	Fitchburg	21
Allentown	49	Lowell	21
Harrisburg	41	Lynn	20
Altoona	33	Newton	20
Wilkesbarre	29	Cambridge	18
Erie	28	Worcester	18
Scranton	23	Fall River	15

Many other cities in the United States stand the same chance of an outbreak of this disease as did Butler. In many other cities the typhoid deathrate is culpably high. Because such conditions can be readily remedied, it is wasteful—yes, even criminal—for them not to do so.

JANUARY (1904) AND ANNUAL MEETING

OF THE

Massachusetts Association of Boards of Health.

The quarterly (and annual) meeting of the Massachusetts Association of Boards of Health was held at the Brunswick Hotel, Boston, Wednesday, Jan. 27, 1904. The First Vice-President, Dr. Samuel H. Durgin presided in the absence of the President, Dr. H. P. Walcott.

Mr. Edwin L. Pilsbury, of Boston, Dr. H. C. Emerson ,of Springfield and Dr. Frank A. Woods, of Holyoke, were appointed a committee to nominate officers for the ensuing year.

THE CHAIRMAN: While the nominating Committee is doing its work, we will listen to the Treasurer's report for the past year.

DR. FIELD: Mr. Chairman, in presenting any Treasurer's report for this Association, the members ought to understand that the financial welfare of the Association is intimately bound up with the financial welfare of the JOURNAL. When the JOURNAL is nearly self-sustaining, it is in a prosperous condition, the Association can easily get along on a $2.00 due, sometimes on a $1.50 due. When the JOURNAL is not self-sustaining, and has to call on the Association almost wholly for its support, we would soon get into a condition of bankruptcy. That condition of affairs held for a part of 1902 and the first part of 1903; we were paying out more for the JOURNAL than we were getting in. But owing to the wisdom of our publishing committee the JOURNAL, I understand, is now in a very excellent condition, and so consequently the Association is once more prospering and taking in more money than it spends.

TREASURER'S REPORT FOR 1903.

RECEIPTS.

Balance from 1902	$922.25
Interest	34.45
Annual assessments	433.00
	$1,389.70

EXPENSES.

Clerical assistance	$21.40
Printing	27.55
Postage	40.00
Toward publishing JOURNAL	184.43
Five sets first volume JOURNAL	7.50
Cigars	24.08
Illustrating paper	10.00
Dinner for guest	1.50
Treasurer's bonds	4.00
	$320.46
Balance to 1904	$1,069.24
	$1,389.70

Of this balance $945.39 is drawing interest in a Savings Bank.

Respectfully submitted,
JAMES B. FIELD, *Treasurer.*

Examined and approved as correctly cast and properly vouched for.

J. ARTHUR GAGE, *Auditor*

(On motion of Mr. Coffey the report was accepted and placed on file.)

THE CHAIRMAN: Is the Committee on Nominations ready to report? If not, incidental business is now in order. If there is no other incidental business, I would say in regard to the JOURNAL of the Association, especially after what our Treasurer has stated, that a new contract has been made for the publishing of the JOURNAL. I am happy to say that the last contract was well put, that the JOURNAL is in a better condition to-day than ever before and everybody seems well pleased with it, and that the outlook is better than ever before.

I wanted also to say that there must be very few in the Association who will remember to have seen a copy of the Constitution and By-Laws. There was such a publication, but it would be difficult to find one to-day. I wanted to suggest that the Secre-

tary be authorized to publish 1,000 or 2,000 copies for distribution among the present members. It will be useful for the members to look at occasionally, especially as alterations have taken place since anybody has seen a copy. Is there any motion?

(On motion of Dr. Miller, of Needham, the Secretary was authorized to print and publish 1,500 copies of the Constitution and By-Laws.)

THE CHAIRMAN: Is the Committee on Nominations ready to report?

THE ELECTION OF OFFICERS.

MR. PILSBURY: Mr. Chairman, the Committee on Nominations submits the following list of nominees:

For President, H. P. Walcott, M.D., of Cambridge.

For Vice-President (First), S. H. Durgin, M.D., of Boston.

For Vice-President (Second), S. W. Abbott, M.D., of Newton.

For Secretary, James C. Coffey, of Worcester.

For Treasurer, James B. Field, M.D., of Lowell.

For Executive Committee (for two years), G. L. Tobey, M.D., of Clinton; W. H. Gove, of Salem; C. A. Hicks, M.D., of Fall River; George H. Ellis, of West Newton; C. V. Chapin, M.D., of Providence.

THE CHAIRMAN: Gentlemen, you hear the report of the Nominating Committee. What is your pleasure?

MR. PILSBURY: Mr. President, unless the Constitution requires election by ballot, I move that the Secretary be authorized to deposit one ballot representing the sentiment of the Association, thus saving time, there being but one nominee for each office.

THE CHAIRMAN: In the absence of a Constitution and By-Laws the Chair rules that you are safe.

(The motion was adopted, and the Secretary cast one ballot thus electing the nominees of the committee.)

Is there any other incidental business?

There is a protest from a member of the Association, Dr. Hill, against proposed legislation on vivisection. It is in the hands

of Mr. Rickards, who is present, and who will read it and also will explain other matters in its connection.

MR. RICKARDS: Mr. Chairman, notwithstanding the remonstrance that was made last year by this Association to the bill before the House at that time, preventing animal experimentation, the anti-vivisectionists in putting in a bill this year have absolutely forbidden either municipal laboratories or laboratories connected with hospitals making any experiments upon animals. For this reason, the following remonstrance has been drawn up:

To the Committee on Probate and Chancery.

GENTLEMEN:

The following resolutions relating to House Bill No. 174 are submitted for your consideration:

Resolved, That the Massachusetts Association of Boards of Health assembed at its regular annual meeting in Boston, Jan. 27th, 1904, desires to protest and does hereby protest against the restrictions imposed in Section 1 and 2 of House Bill No. 174 upon the scientific work in animal experimentation of the Universities, Colleges and the State Board of Health of this Commonwealth. This Association recognizes the advances in the knowledge of disease, its cure and its prevention, secured by the free and unhampered investigations conducted by such bodies. The public health has profited in the past and will profit in the future by the results of such work, and the Association believes that the restrictions imposed are unnecessary, retrogressive and harmful.

Resolved, That this Association further protests against Sections 1 and 2 of the same bill, since these Sections taken together do not merely place restrictions upon animal experiments, but absolutely preclude municipal Boards of Health from making any animal experiments whatever. Well-known statutory duties are laid upon municipal Boards of Health in the detection and prevention of infectious diseases. Such exclusion from animal experi-

mentation would deprive Boards of Health of an invaluable means for carrying out their statutory obligations.

Resolved, That this Association call to the attention of the Committee on Probate and Chancery a similar protest, made last year against a bill, identical in the Sections referred to with the bill under consideration; which protest was signed by the Boards of Health of 32 cities and about 19 towns of this State.

Resolved, That copies of this protest be forwarded for signature to the Boards of Health of this State and that those members present at the annual meeting be given the opportunity to sign a copy; said signed copies to be forwarded to the Committee on Probate and Chancery as the official expression of the views of the public hygienists of the State.

The Board of Health of

officially endorses the above protest.

For the Board of Health (Sign.)

Title

It is requested that each member present sign this protest; also that the Association as a whole vote upon it, and that a representative of each Board—not each representative of a Board but a representative of each Board— take a copy and have it officially signed by his Board. Copies of the protest will be passed round. After being signed they should be forwarded to Mr. Pilsbury, of the Board of Health of Boston.

THE CHAIRMAN: Gentlemen, you have heard the protest as read by Mr. Rickards. What is your pleasure? I would like to say that this is a most serious matter with Boards of Health which carry on necessary experimentation with animals. I hope the Boards of Health of the State will do as nobly this year as they did last. Any motion to be made?

DR. WORCESTER: I move that this protest be sent to the Committee on Probate and Chancery, with the expression of this Board attached.

THE CHAIRMAN: The question is asked whether this body will endorse the protest.

DR. WORCESTER: I move that this body endorse the protest. (The motion was seconded.)

THE CHAIRMAN: It is moved and seconded that this Association approve of this protest. Anything to be said?

PROF. SEDGWICK: Mr. President, just one word. In addition to the signatures to this important protest, I trust that all members of Boards of Health, and especially those remote from Boston, will take pains to see their local representatives, and make sure that these representatives are informed in regard to the matter and, as far as is legitimate and proper, are influenced to vote in the right direction. That is quite as important, in my judgment, as entering this protest; although that should certainly be done also.

(The motion was adopted unanimously.)

DR. MILLER: Mr. President, I would like to ask if the gentleman, or you can tell us when this subject will come up before the committee for hearing, and what committee it will come before at the State House. I think a good many of us would like to be there. There is a set of annual, chronic kickers, that come up there as regular as clock work. I think it will be interesting to see them; I have done so several times. There is a certain class of men and women that are born in a negative condition, and are prepared to oppose anything. I believe it will be well for us to know just when the hearing will occur and what committee it will be before.

THE CHAIRMAN: Has Mr. Rickards any information which he can give upon this subject?

MR. RICKARDS: Mr. Chairman, it is before the Committee on Probate and Chancery. The bill is House Bill No. 174. The

date of the hearing has not yet been set. Usually it comes up in the latter part of March or the first of April. The calendar is watched very closely, and when it does come up we will notify you.

(NOTE.—The Legislature has since set the date of the first hearing on Wednesday, March 2d, at 10.30 A.M.)

THE CHAIRMAN: Have you copies of this to distribute, Mr. Rickards?

MR. RICKARDS: I have copies of the resolution, yes, sir. Mr. Pilsbury I believe has the copy for members' signatures, and also copies to be passed round for the official signatures of the Boards of Health.

THE CHAIRMAN: Mr. Pilsbury always attends to his duty, and I think he will in this case. Is there anything else to come before the Association under incidental business? If not, we will listen to the paper by Prof. Theobald Smith on: "Some of the ways in which infection is disseminated."

SOME OF THE WAYS IN WHICH INFECTION IS DISSEMINATED.

BY PROF. THEOBALD SMITH,
Pathologist, Mass. State Board of Health.

It has been said somewhere that the chief function of the local boards of health is to abate nuisances, but I believe that their work is much more important than this. I think that perhaps one of the most important of their functions is to prevent the circulation, as it were, of disease germs and to keep them confined to the immediate environment of the patient, where they are most readily destroyed by suitable disinfectants.

When our honored Chairman asked me about a week ago to speak upon some subject at this meeting it seemed to me that I could do nothing better than to speak upon this perennially interesting subject of the transmission of infection, because it is essentially the function of the machinery of public health, not to drive out the disease germs after they once have entered the body,

for that is the business of the physician, but to see that they do not pass from one patient to another. This passage of disease germs is so complex, it is so interwoven with all the details of our family and civic life and with traveling and commerce, and our point of view gradually changes with the discovery of new facts that even to-day the precise determination of the sources of infection in many epidemics cannot be made and investigation frequently ends in mere conjectures. We cannot therefore give too much attention to the details of transmission for the more circumspect our information the more accurate our conclusions. It is essential that we should know the disease germ which produces a given disease before we can trace its progress from one patient to another, and you know definitely that in case of the most important of the diseases, those that give civilized society the greatest trouble,—the eruptive diseases,—practically nothing is known of the micro-organisms which cause them. It is true that we know something of the micro-organisms of smallpox, and of scarlatina, but our knowledge of those organisms is still in its infancy. We know practically nothing of their life history, and we are unable at present to follow their entry and exit from the body, as is possible with the pathogenic bacteria.

We are apt to lose sight of the fact that it is a biological necessity for disease germs to be transmitted, and that the entire mechanism of infection is directed towards this necessity of being eliminated or set free to invade another host. When micro-organisms enter an animal or a human body that is susceptible, they find there a soil that is favorable to them, and they begin to multiply. But as they go on multiplying, a time comes when the forces of the body turn against them, when, as we now say, a number of anti-bodies are formed—anti-toxines agglutinins, bactericidal and other, unknown, substances—which begin to interfere with, to suppress and to destroy the bacteria. Hence, after a certain stage of the disease, the soil becomes unfavorable, the bacteria must be eliminated and attack another individual, in order that their own life may be preserved. As a result of this necessity in all infectious diseases, micro-organisms have succeeded in developing a perfectly definite, either simple or complicated way

of getting out of the body. In the eruptive diseases perhaps the greatest success has attended their efforts. The infection is presumably drawn into the respiratory passages. After a variable period of incubation and fever depending on the germ, they are distributed over the whole body through the blood and appear in the skin, whence they are shed with the crusts in small pox, the desquamating scales in measles and scarlatina. I might continue to illustrate this process of elimination but it is already well-known, and I simply call attention here to a phenomenon which is a necessary stage in the life history of pathogenic organisms and not merely accidental. It is the one stage demanding the greatest attention from the public health officers and the sanitarian.

The infection, as it leaves the body is in a latent stage and it must be carried passively in some vehicle or medium, living or dead, to reach the next host or victim. The air is, among all the media, the one which has received the earliest and greatest recognition. Being an element of great power, though itself unseen, and transporting visible vapors, smoke and particles of dirt and invisible odors through long distances, it naturally impressed peoples in the infancy of science and the medical art as the one vehicle which was responsible for the mysterious dissemination of plagues. But even to day the air is still regarded as a most important aid to the germs of the eruptive diseases, where the shedding of particles of skin from the body in these various diseases, their transmission through the air, and their inhalation into another body, completes the cycle for those particular organisms. We also know that in tuberculosis transmission of the bacilli through the air is perhaps the most important mode. In the early days of our knowledge of tubercle bacilli the dry sputum, ground up into dust and carried in the air, was considered the chief factor in transmission, but a few years ago Fluegge, the associate of Koch for many years in hygiene, suggested another theory, which he has since demonstrated by exhaustive experiments that a more important vehicle perhaps, than the dry dust are the infinitesimal particles of moist sputum which are cast from the mouth during speech, especially during the formation

of certain letters which cause a sudden expulsive outward movement of the air, and during coughing and sneezing. These minute particles have been found suspended in the air for half an hour after they have been emitted. In the case of tuberculosis it is supposed that this danger of infection exists within a zone of about three feet in circumference of the patient since these particles appear to be transmitted in all directions. In tuberculosis, then, the air, not only in carrying the dry particles, but also in holding in suspension the moist particles, forms the chief vehicle of contagion. The moist particles are the more infectious for in drying, a great many tubercle bacilli lose their life.*

The air, also, served a purpose in the earlier days of bacteriology in the minds of health officers in carrying typhoid, dysentery and diphtheria. although to-day we do not look upon the air as a vehicle of any importance in these maladies. It is not more than eight or nine years ago that these were supposed to be communicated largely in sewer air. We can hardly appreciate that fact to-day for knowledge is absorbed and diffused so rapidly. I remember talking in 1895 to a prominent health official of one of our neighboring States on the subject of diphtheria. At that time anti-toxine had just been introduced. Evidence had already been accumulating that convalescents might carry infection and that diphtheria was transmitted chiefly by direct contact, or at any rate only in close proximity to the patient. But this prominent health official clung, as all did at that time, to the theory that sewer gas must be the chief agent in spreading diphtheria. The only thing that puzzled him was that he just had an epidemic in a schoolhouse in the country where there was no sewerage system under investigation, and he began to think about the possibility that there might be other means of contagion. Most of us, perhaps, remember that at that time, or shortly before, the plumbing was always overhauled in a house where typhoid and dysentery occurred. Now I think very few would pay any attention to the plumbing whatever, excepting to see that there were no open privies on the place.

*The theory which press dispatches are ascribing to Prof. Behring, that all tuberculosis infection is introduced by way of the digestion tract, does not in my opinion have any supporting evidence. Although the possibility of a pulmonary tuberculosis originating from a focus in the mesenteric glands or the liver is conceded, yet the traces of such a passage must as a rule be in evidence.

Malaria was also carried by the air in the theories of the past, and this is true in one sense only now we have personified the infection in malaria in the mosquito. The insect simply uses the air in carrying the virus from one individual to another.

With the perfecting of bacteriological methods and the more detailed study of pathogenic bacteria, the air was gradually robbed of some of its functions as vehicle of disease germs and in its place came the food and drink. This vehicle has assumed very great importance in the life of civilized communities to-day in which so little of the food consumed is raised by the consumers. Millions of people in our large cities are fed with food coming from far and near, and a most interesting feat would be the tracing of the sources of the food which appears upon our table on any one day. This great drainage area of our food supply naturally enough signifies many opportunities for our food to act as a vehicle for infection before it reaches us.

Fortunately the cooking of our food enables us to escape all infections coming from unknown, uncontrollable sources. But we still consume certain things raw and it is the raw food and drink which is largely responsible for the endemic scourges of our civilization, typhoid. dysentery, the diarrhœal diseases, cholera and in a few cases tuberculosis. The vehicles are largely drinking water, milk and oysters.

So much has been said in the daily press and medical publications of water as a disseminator of certain intestinal diseases, that I can pass that by to-day. We have had within the last year such marvellous demonstrations of the carrying power of water with reference to typhoid bacilli in different parts of the country that they are all fresh in our minds. It is a strange fact that these large epidemics are associated with progress in public hygiene and sanitation because they mean a large common water supply, and they could not occur without the existence of such a supply; they are in fact the result of sanitary progress in so far as sanitation has just gone half way. We still continue to throw our typhoid-laden sewage into water courses, and then we take our water from them to again contract typhoid fever. The public has acknowledged the necessity for pure water, but it has

not yet torn itself away from the filthy habit of polluting its rivers whence the water is taken, or else it has not taken suitable means of purifying its supply from polluted sources. We have here an instance of the fact that going half way towards a well-defined goal and then halting is actual retrogression.

Milk is another vehicle of infection, and inasmuch as Dr. Harrington will speak upon this subject I shall pass it by. However, I cannot refrain from making the remark that it is an anomaly for civilized people, who know so much about the dangers of miscellaneous dirt as we do, to continue to drink raw milk from unknown sources, when we consider that it is such a favorable nidus for the multiplication of bacteria, and that it may contain infection at any time. I believe that raw milk as a beverege ten years hence will be a matter of the past.

In considering the minute details of the elimination and transmission of disease germs, it is of the utmost importance to recognize definitely the true sources of infection. These, it will be answered are, of course, the diseased body which is a kind of producer of infectious organisms. This is true as far as it goes, but it is not the entire truth. In recent years our information has brought to light the fact that important sources of infection have been overlooked. These sources are the individual affected with a very mild type of disease, the convalescent or recovered case, and the perfectly well person who may act as carrier.

The individual affected with a mild type of some infectious disease is producer and carrier combined. Such cases are the most trying. They are probably responsible for more infection than all the severe cases that the physician has to deal with. It is the so-called ambulatory cases of typhoid, dysentery, smallpox, measles, and so on, which are responsible for most of the dissemination of these diseases. At present the Widal or agglutination test is of much service in detecting doubtful cases of typhoid.

The next class of cases might be called the carriers chiefly. It has been discovered within the last five or six years that the bacteria which produce certain diseases linger in the body for some time after recovery; they do not at once disappear. This is espe-

cially true with the intestinal diseases. When all symptoms of disease have subsided, patients may still harbor bacteria and shed them. This we know is true of diphtheria, because generally two, or possibly three weeks after the disease is over diphtheria bacilli can be detected in cultures. We know that typhoid carriers are often convalescents who have not yet rid themselves of the bacteria. This subject is now creating considerable attention, especially in Europe.

The Institute for Infectious Diseases in Berlin is making exhaustive observations upon the sources of infection in typhoid with special reference to recovered cases and well persons caring for the sick. I was told while there last summer of the infection of a woman with typhoid by her husband six months after his recovery therefrom. The bacilli were being eliminated in the urine.

The last sources of infection I shall speak of are carriers exclusively. They are healthy persons, who have not had the disease, but who have been associated with cases of it. In the case of diphtheria a committee of the Association has worked out that phase of the question very well and it was found from extensive statistics of throat cultures that perhaps one per cent. of persons carry diphtheria bacilli in their throats. In the case of typhoid it has been found that nurses or other persons concerned in the care of typhoid fever patients may have the bacilli in their intestines, as shown by the delicate methods of bacteriology. In the time of the German epidemic some years ago, cholera spirilla were found in the intestines or in the stools of the boatmen who were travelling up and down the streams of Germany, and who were probably responsible for the distribution of the cholera bacilli in a peculiar way, namely, up stream, or against the current. In all these cases, the infection is intestinal in origin and communicated in food and drink.

In regard to the eruptive diseases, we know very little concerning the persistence of these microbes, or their multiplication in the body after recovery, but I think the general consensus of opinion among health officers would be that there is no such thing as indefinitely persisting infection in the eruptive diseases,

that after a certain time the patient may be considered absolutely free from infection, and that if there is any infection traced to his case after proper quarantine it is attributable more to his clothing or to his environment than to himself.

When we consider these producers and these carriers of infection more closely, we can understand certain facts that it otherwise would be difficult to appreciate. One of them is that it is always dangerous to drink polluted water, for the reason that the fæces of even healthy persons, or persons who have had a mild attack of typhoid, may have passed into any stream or river and pollute it. The argument that there is no typhoid on the watershed is absolutely of no value to-day; the danger is potentially as great, because there may be cases that nobody knows of.

In the next place, all large gatherings of people are likely to develop typhoid sooner or later. This was clearly demonstrated during the war with Spain in 1898, where nearly all the camps in our country became infected with typhoid fever soon after the soldiers came together. The unsanitary way of living, the crowding together, and certain other agencies that I shall speak of later on were conducive to the distribution of typhoid, probably from the carriers,—those who were well and who brought the germs into the camp, or those who had just recovered and were still shedding them. In a similar manner all large collections of human beings, when unsanitary living must be resorted to are likely to contract some form of intestinal infection.

With a better knowledge of the possibility that human beings may carry certain diseases and yet be well, the importance of what has been known in the past as fomites carrying disease has somewhat declined. It is true that there is always danger in the environment of a tuberculous patient, or, possibly, in that of a typhoid fever patient whose stools have not been properly taken care of; but I think that with our better knowledge of disease carriers during convalescence and even during health, much of the disease that we have hitherto credited to fomites, to clothing, and so on, must be ascribed to these carriers themselves. The length of time during which bacteria live in our environment is a matter of great uncertainty as it depends upon various

conditions. If micro-organisms are abundantly encrusted with pus, or blood, or sputum, they will live a much longer time in the dried state than if they are not, for these substances form a protecting envelope. No one can tell exactly how long disease germs may live in our environment. Hence the continued necessity for thorough disinfection. This disinfection must not, however, make us indifferent toward the possibility that the environment may be reinfected by the various carriers cited above.

There is one other class of transmitters of whose agency our knowledge dates back only about twelve or thirteen years. They belong to the class of insects, and to lower forms that are closely related to the insects, namely, the large group of the Arachnids. We are all familiar with the action of mosquitoes in carrying yellow fever and in carrying malaria. These are two diseases that must be carried by these parasites. In other words, there is no other vehicle of transmission. Not only are they carriers but they are producers as well, for the parasites taken from the blood by them are multiplied many times in their bodies. The life cycle of the micro-organism that produces malaria is very complex, for it undergoes considerable development in the body of these small insects as secondary hosts before the infection is ripe to be introduced into the body of another individual. In animal diseases we have learned to know a number of such necessary transmitters. In the case of Texas fever, or hemoglobinuria, in cattle, a malarial disease found all over the world, a skin parasite which stands close to the insects and which is popularly known as the cattle tick carries the micro-organism of this disease, and it cannot be carried in any other way. There is a disease of the blood among domestic animals in Africa, which is carried only by a certain fly (Glossina morsitans) which, resembles the house fly very closely, but which bites or stings. Where this fly is absent the disease which it carries is also absent. This affection, which is due to a little protozoon in the blood, presents such serious obstacles to agriculture that it is almost impossible to bring cattle, and horses, and other domestic animals, into the country to improve agriculture, because of this disease which is carried by these flies.

There is one very important fact which has been brought out in the study of these diseases that are carried by insects and in no other way. After the disease is over the parasite does not leave the body; in fact, it remains indefinitely, but in very small numbers in the body of the immune individual. In our own state much of the malaria that has prevailed in recent years is probably carried hither in the blood of people who have lived in malarious districts ever since their birth, as in parts of Italy. They come to this country, live in crowded labor camps, and give the mosquitoes a chance to carry the parasites in them to the neighboring population. The same is true of the malarial diseases of animals. If we import a cow from North Carolina, South Carolina, or any State still farther South, and bring it into any of our herds in Massachusetts, say, in mid summer, it is probable that at the end of October nearly all of our animals will be dead. The cow brings in her blood the bovine malarial parasite; although perfectly well herself she carries on her body the cattle tick, which transmits the blood parasite from her own blood and inoculates it into the animals in the North. The Southern cow is immune, but the Northern cows are very susceptible, and ninety per cent. of them die when they are infected. The same story may be told of the African blood parasite which is transmitted by the fly. It was found by the discoverer, Bruce, some seven or eight years ago that the game in Africa which he shot contained this parasite. The game was perfectly well, at least it showed no signs of the disease. The fly, drawing the blood from the game which carried the parasite lights upon the domestic animals brought in from Europe and introduces the parasite. The domestic animals, not being immune, being, in fact very susceptible, die.

It should be emphasized that these mosquitoes, flies and ticks, are the only transmitters of their respective diseases; that there is a definite, complex relationship between the human being or the animal, the tick or the mosquito and the blood parasite, in virtue of which the latter needs both the insect and the human or large animal in order to complete its life cycle.

There are a number of other parasites which come up for con-

sideration in our climate as possible carriers and transmitters of disease. For example, the bedbug is quite a universal blood parasite, and is probably found in a great many houses in our country. Those of you who travel on certain steamboats in summer and fall will encounter specimens. In view of the discoveries of the transmission of disease by insects, experiments were made by Nuttall, by letting bedbugs bite animals, chiefly mice, that were infected with various disease germs, but in all cases the transmission proved negative; that is to say, the animals were not infected by the bite of bedbugs after the latter had drawn blood from diseased animals. The flea is another insect upon which suspicion has fallen, but it plays an unimportant role in this country. Occasionally the dog flea is said to attack man, but with us it is a comparatively rare occasion. In countries like India the flea is a common human parasite, and the transmission of the plague from rats to man has been ascribed to it by certain French students of the plague in that country. The rat flea belongs to a wholly different family from that of the human flea, and there are grave objections against accepting the theory that the flea of the rat can transmit plague from rat to man. The probabilities are that the natives are bitten by various insects, that they scratch these wounds, and that by scratching they open a portal for the entry of the plague bacillus, which enters successfully the smallest wound. The native domiciles in India are said to be very primitive. The floors are of earth, and the people walk barefooted. It is easy to conceive that slight injuries may result to the feet, and that the scratching due to the bite of insects may lead to infection; but the flea itself probably is not the transmitter. Occasionally it may occur that by killing an animal upon the skin the bacteria which are contained in that animal are set free when the animal is crushed, and then being in close proximity to the wound produced by that or some other animal they could get in. It is only in such a way, as Nuttall points out, that fleas or bedbugs may carry infection.

There is still one other insect under suspicion to come into consideration, and that is the house fly. I can only say a few words upon this insect, although it is the most important. The

house fly does not bite, as you know, but it is a voracious devourer of all kinds of filth. The fly lays its eggs chiefly in horse manure, and at about the end of a week the young have become adult, so that wherever manure of animals is concentrated, flies will breed plentifully. It is well known that flies will pass from filth, like fæces, to food in close proximity, and it has been demonstrated by actual experiment that flies which have been feeding upon fæces from cases of typhoid fever thrown into open privy vaults contain the typhoid fever bacillus. These bacilli may pass through the body of the fly. The discharges of the fly may be dropped upon food, more particularly into milk, wherein they may multiply on a warm day. The milk may then become the source of infection for new cases. The fly may also carry infection on its body and feet. In 1902 an epidemic which was prevalent in Chicago assumed unusual proportions in certain districts, and after a very thorough investigation of all the possible causes that might lead to the dissemination of the typhoid fever bacillus, Dr. Alice Hamilton, who was then working in the laboratory of the Memorial Institute for Infectious Diseases, came to the conclusion that flies were the disseminators. She was able to cultivate typhoid bacilli from flies which had been caught in the infected locality. The sanitary conditions were such that flies were able to get at the virus, because a number of the houses were not connected with the sewers, and still had open privies, into which the stools were thrown.

It seems to me that the fly is the one insect next to the mosquito in this climate to which we should direct our attention. Being a ubiquitous insect, and eating all sorts of things, it is possible that the fly may transmit all forms of intestinal disease that are due to bacteria—typhoid fever, dysentery, the various forms of diarrhœa, and cholera. I should also call attention to the fact that flies will eat sputum, and tubercle bacilli have been known to be carried in the body of the fly from one portion of a hospital to the other. It is very important that houses harboring certain infectious diseases should be thoroughly screened, and that especially the food should be protected in such a way that flies which have had access to filth cannot contaminate it.

In the house fly the earlier theory of the transmission of certain intestinal infections through the air becomes to a certain extent rehabilitated. It is only by the insertion of new links of evidence from time to time that our information becomes more precise, and therefore more effective. It makes a great difference whether infection is carried by insects or by infinitesimal particles floating in the air. The former can be guarded against more or less effectively, the latter not.

THE CHAIRMAN: Dr. Smith's paper is open for discussion. Are there any remarks to be made upon Dr. Smith's paper? Before proceeding to the next paper, we will take up the election to membership of the following list of candidates, which have been approved by the Executive Committee:

Dr. H. Carlton Smith, Chemist, of Brookline.
Dr. E. A. Hubbard, of Ashby.
Herbert A. Tilden, of Cohasset.
Dr. Nelson M. Wood, of Charlestown.
Dr. John T. Cahill, of Lawrence.
Dr. D. B. Sullivan, of Bondsville.
Abbott W. Packard, of Brockton.
Dr. C. A. Cheever, of Mattapan.

(On motion of Mr. Ellis the gentlemen named were elected members of the Association.)

The next paper on the program is upon "The Source, Effect and Prevention of Dirty Milk," by Prof. Charles Harrington.

SOURCES, EFFECTS AND PREVENTION OF DIRTY MILK.

BY CHARLES HARRINGTON, M.D.

Inspector of Milk and Vinegar of the Boston Board of Health.

In bringing this subject to your attention, I am conscious that I have no new facts to present; but the sanitary importance of a clean milk-supply is so great, and so much can be accomplished in the saving of infant life if we can but arouse the interest of the people and of the local boards of health in the matter, that I may be excused if I bring together, for the purpose of dis-

cussion, some well-known facts and offer some suggestions for bettering present conditions.

Massachusetts is fortunate in the possession of an almost perfect law for the suppression of milk adulteration, but it was not until 1883, when its general enforcement was intrusted to the State Board of Health, that its provisions were much respected by those who sought profit in water. It was the vigorous action of the body that led the local authorities, one by one, to pay a decent regard to the rights of the consumer, until now the matter of fraudulent manipulation is fairly well in hand, though it requires constant watchfulness to keep it so. Thus far, the supervision of the milk dealer has been more in the nature of police than of sanitary administration, but the time has come for recognizing more thoroughly the true sanitary side. It was, and is, no easy matter to restrain ordinary adulteration; it will be far more difficult to bring about a marked diminution in the amount of accidental deterioration, because among other things it will involve a large measure of popular education in a subject in which, strange to say, the public is not especially interested. But the case is far from hopeless, and I believe that we can succeed, although the fruits of our labors may be slow in growth.

When we speak of dirty milk we mean milk which, largely by reason of the admission of preventable dirt, but equally, or even more, in consequence of improper methods of cooling, handling and storage, contains excessive numbers of bacteria.

The preventable dirt gains access in various ways. It is derived chiefly from the body of the cow, and consists largely of hairs and particles of excrement. A single hair may contribute hundreds and thousands of bacteria to the milking-pail, and the number of hairs which may be dislodged from the parts immediately above the pail during the process of milking, through the necessary manipulation of the udder and the contact of the peson of the milker, is very great. In the same way, and through switching of the tail, particles of excrement laden with bacteria fall in a constant shower into the pail. It has been calculated that, under ordinary conditions of handling and storage, the presence of about a twelfth of a grain of such dirt per quart will cause

each cubic centimeter of the milk to yield nearly three and a half millions of bacteria by the time it is delivered to the customer, and Backhaus has reckoned the amount of cow-dung that the population of Berlin consumes daily with its milk at about 300 pounds. Professors Russell, Freeman and others have shown by interesting experiments the yield of bacteria which may be expected during the milking of an ordinarily dirty cow. Thus Russell caused a cow to be milked in the open air, with a gelatine plate exposed for one minute near the pail, and found that in that period no less than 3,250 bacteria must have gained access to the milk; and Freeman collected on a plate of 3.5 inches diameter, similarly exposed for two minutes, no less than 1,800, which means that, in the course of a minute, more than 6,000 dropped on an area equal to that of a ten-inch pail.

Next we have to consider the person and clothing of the milker. His hands, hair, beard and clothes are ordinarily more or less rich in dirt and bacteria, and these he contributes liberally while performing his office.

Of very great importance too, in the bacterial content of milk, is the condition of the milking-pails and other vessels. A milking-pail cleansed in the ordinary way is very different bacteriologically from one which has been properly sterilized. Professor Russell has shown that, under similar conditions of milking, a cubic centimeter of milk drawn into a sterile pail yielded 165 bacteria, while the same volume taken from another which was cleaned in the ordinary way yielded 4,265.

Much dirt and many bacteria are derived also from the dusty air of the cow-stable, especially when dry hay is thrown to the cows just before milking.

But it is not alone from external sources that the bacteria of milk are derived, for myriads exist in the ducts of the teats even under the best of conditions, for when the operation of milking is concluded there is sufficient milk left in the teats to supply nutrient material and favor multiplication of the bacteria that may enter the external orifices during the interval that elapses before the next milking, by which time, under the favoring condition of the body temperature, they increase enormously

and are ready to be washed out in the fore-milk. The ducts may be so richly supplied that each jet of milk, even to the last of the strippings, may yield the organisms in great numbers. In case of mammitis, or garget, which is the most common disease of cows, and which may exist without showing any marked evidence of its presence, the number of bacteria per cubic centimeter of milk may be very great. The fact that the onset of the disease is often very insidious and that the milk may show no gross evidence of its existence makes the exclusion of infected milk from the market a matter of very decided difficulty.

Thus far I have dealt with the milk up to the end of the milking process, when under ordinary conditions it is richly endowed with dirt and bacteria. It is a most excellent breeding-ground, and the temperature is favorable for rapid multiplication. If the temperature is not lowered at once, we must expect the inevitable consequence, which is rapid deterioration; but with rapid cooling to below 45° F. the bacteria will not increase materially and may even diminish in number. Indeed, rapid cooling is of even greater importance than cleanliness, for an ordinarily dirty milk, if rapidly cooled, will show better keeping qualities than clean milk not so treated. But it is not enough that it be quickly cooled; it should be kept at as low a temperature as possible from the time it is drawn until it is consumed, for a marked rise in temperature induces bacterial multiplication, which, as Park has shown, may attain almost inconceivable proportions. Thus, he took a specimen containing 3,000 bacteria per cubic centimeter and divided it into five parts, which he kept at different temperatures for 24 hours. That kept below 50° showed no increase; at 60° it went from 3,000 to 180,000; at 68°, from 3,000 to 450,000; at 86°, to 1,400,000,000, and at 94° to no less than 25,000,000,000. Another specimen, kept at 90° for 8 hours, went from 92,000 to 6,800,000, and a third from 2,600,000 to 124,000,000.

It is, of course, quite impossible to market milk containing no bacteria whatever. They are ubiquitous and will gain access in some numbers, but their numbers are dependent upon the conditions at the dairy and during transportation and storage, and especially upon temperature and age.

Next, let us consider the consequences of using bacterially contaminated milk. The enormous loss of infant life during the warmer months has long been regarded as in the natural order of things, but it is only within comparatively recent years that statistics have shown that it is the bottle-fed and not the breast-fed infant that makes up the great bulk of the mortality from diarrhœal diseases, which, in reality, are in most cases nothing more nor less than food poisoning, due either to the bacteria consumed with milk or to toxic substances elaborated before ingestion. If due to the latter, it would appear that these substances are destroyed by exposure to temperatures of about 170° F.

Professor Conn has given a list of about 200 different species of bacteria which he has isolated from milk, but the vast majority of these are probably without sanitary significance. Of the comparatively small number which are known to cause deleterious changes, Professor Russell asserts that six species are almost invariably present. According to English, French, German and American investigators, the latter including Bergey, Reed and Ward, and Stokes, market milk is very commonly infected with streptococci, which organisms are the chief exciting cause of garget, and are believed to be that of much disease among infants and even among adults. Local outbreaks of acute gastric catarrh and of violent diarrhœa with severe abdominal pain have been known to occur among the customers of individual dairies, where investigation has revealed garget in the cows and streptococci in abundance in the milk.

Another source of bacterial infection not hereinbefore mentioned has lately been pointed out, with its consequences, by English observers; namely, the road dust of cities and towns. About five years ago Dr. E. W. Hope produced interesting figures, showing that at Liverpool, during 20 years, the highest death rates from diarrhœal diseases had gone hand in hand with the driest summer weather, and the lowest rates with the wettest weather. The 14 dry summers showed an average rate of death from these diseases about 50 per cent higher than that of the six average wet summers. In the *Journal of Hygiene* for July, 1903, Richards asserts that the infection of food poisoning

takes place usually in the home, and that urban conditions are hazardous chiefly from the amount of pollution in the yards and roads; and he advocates, as one important practical preventive measure, the prevention of dust by copious watering of the roads.

In the August, 1903 number of *Public Health* are two papers of interest in this connection. Dr. Arthur Newsholme, the leading M. O. H. in England, states that he is of opinion that frequent summer rains, although the total precipitation be not great, are one of the most effectual means of keeping down the diarrhœal death-rate. He attributes the relative immunity from diarrhœa at Brighton in 1902 to this influence, and advocates thorough wetting of streets in time of dry weather, and the removal of the mud thus formed. In his opinion rainfall is more important than temperature in relation to epidemic diarrhœa. Dr. Herbert Peck, M. O. H. for Chesterfield, ascribes the low diarrhœal death-rate in his district in 1902 to the same cause, and, like Newsholme, believes that the amount of rain is of far less importance than its frequency.

Fortunately, it is during only a portion of the year that polluted milk plays its great part in the causation of fatal diarrhœal disease. In the course of an extensive investigation of the effects of dirty milk conducted by Drs. Park and Holt and reported in the *Medical News* of December 5, 1903, it appeared that during cool weather neither the mortality nor the health of the infants observed was appreciably affected by the kind of milk or by the number of bacteria which it contained; but during hot weather, when the resistance of the children was lowered, the kind of milk taken influenced both the amount of illness and the death-rate. The infants fed on raw milk did much less well in summer than those whose milk was heated. The species of bacteria found were very numerous, but none of 139 which were isolated in pure culture caused any ill-effects in very young kittens.

I have not dealt with the danger to which Professor Smith alluded, the danger of transmitting some of our common infectious diseases, such as typhoid fever, scarlet fever, diphtheria, etc., which comes from contact of the milk with persons who are either convalescing from or sick with these diseases, or who have

been engaged in the care of those who are sick; nor with the danger of infection of milk through polluted water, with which milk vessels are cleansed, because I have considered merely the question of what we call dirty milk.

Most of the measures necessary for the prevention of dirty milk are so obvious as to need no more than passing mention. The cow-stables should be clean, well-drained and well-ventilated, the cows should be given the same measure of care as is bestowed upon the ordinary driving horse, and yet how many of what are known as gentlemen-farmers look to the grooming of the cows which supply their families with milk, while the horses which they drive must shine like mirrors; even if the cows are groomed and kept as clean as possible, the parts in the vicinity of the udder should be at least dampened before milking; the milker should not be permitted to perform his office with dirty hands and in his bacteria-laden, ordinary working clothes, but should clean himself and don a special suit of clean linen overalls; the milking-pails and other vessels should be not simply clean: they should be sterile; in all cases the first part of the fore-milk, with its abundance of bacteria, should be rejected, as should the entire yield of an animal known to be suffering with garget; the milk should be removed at once to a separate, clean milk-room, where it should be strained and cooled to below 50° without delay. During transportation it should be kept as cool as possible, and on arrival at its place of sale and delivery it should be subjected to as little manipulation as possible, for every process through which it is put increases the possibility of bacterial contamination. Finally, after delivery in the home, it should be protected from dust and dirt and from the influence of ordinary warmth.

But is it possible to have these measures generally observed? Certainly not, at present, any more than it would be possible to insure that every man seen in the streets shall have clean hands and wear clean linen; but great improvement is possible and is worth trying for. How can this be brought about? The first answer that suggests itself is: by education—education of the producer, of the middleman, of the public generally. But edu-

cation by the ordinary methods will be, I believe, perfectly barren of results. In the first place, the general public is indifferent; it thinks it cares, but it does not; it knows the value of fresh milk, but obstinately insists upon the delivery of to-day's milk early to-morrow morning rather than to-day during the forenoon; it prefers glass jars, filled in the horse-stable from the large cans and kept over night in a perhaps not over clean refrigerator, to its own clean utensils, which could be filled at the door; it will not pay a fraction of a cent more per quart for that which is raised under sanitary conditions than for that from the foulest surroundings. Unfortunately, the medical profession is to a large extent somewhat apathetic, or sometimes even worse. Within a month, I have heard a practitioner of some eminence characterize as "damned cranks" those who are interested in promoting clean milk. His children, he said, had grown up all right on good old-fashioned milkman's milk, and this agitation made him sick!

If the public is indifferent and cannot be educated, what will be the attitude of the producer toward an education from which he can see no direct benefit, but only increased trouble and expense? He is a human being and in the main a pretty sensible one, but he does not dwell in Altruria. Can we expect him to employ extra help in order to secure perfect cleanliness; to improve the ventilation and drainage of his barns; to remove his cow-manure daily to a place apart; to sterilize his pails with steam; to buy ice for rapid cooling, and to take other precautions merely to send to market a clean milk, for which neither the middleman nor the consumer will pay a cent per can more than his slovenly neighbor receives? Will he feel repaid by the reflection that perhaps, in the tenements where his milk goes, there is less sickness among the offspring of a foreign-born population in which he takes no interest?

Then how can the public, the producer and the dealer be educated in the importance of clean milk? In the first place, let us simplify the question by eliminating the general public, which does not care and must be saved in spite of itself. Let us deal with the producer who is beyond the town and city and with

the retailer who is within. Something can be done with these two classes, both of whom, when they learn that it is to their financial benefit to do so, will take hold of the matter.

A few years ago, the Board of Health of Boston established certain sanitary regulations applying to the premises of peddlers and of shop-keepers dealing in milk. These were wise, and, although in some instances they seemed to work some hardship, they were necessary. So far as improving local conditions is concerned, they have accomplished much, but not all that is expected, for it is difficult to look after some 3,000 shops, many of which have a tendency to laxness after a license is secured. Revoking licenses on the ground of unsanitary conditions is a wholesome practice which educates by example.

But if it is not an easy task to manage 3,000 dealers, how, it may be asked, can one hope to regulate the 5,000 or more dairies which supply them? I confess that I can see but one method and that is by coercive education through the establishment of bacterial standards and the giving of periodical certificates through the agency of a milk commission. A maximum limit of 500,000 bacteria would certainly be reasonable so far as the producer is concerned, though it sounds high when considered from the standpoint of the consumer. But if the producer will take the necessary precautions to exclude dirt, so that his milk shall yield no more than that number on arrival, it is more than likely that the bacterial content will fall far short of it. If his milk is returned once or twice because of its filthy nature, his education takes a sudden rise, and soon he will find that dirty milk is a poor crop and that it cannot compete with clean. If he takes extra care, let him be rewarded; let him apply for a certificate from a milk commission that his milk is clean and wholesome, and let him use it in promoting his business. If he persists in neglecting to provide clean milk, let him keep his milk for his own purposes and as a warning to his neighbors. The middlemen, peddlers and shop-keepers can be looked after, punished, and rewarded after the same manner, and after a time the milk trade will be composed of two classes: namely, those whose milk contains a minimum number, say 10,000, of bacteria per cubic centimeter,

and may, therefore, display a milk commission's certificate that they deal in clean milk, and those whose supply falls within the regulations, but is not clean enough to be certified—then it will be that the public will have to choose between the two, and if the clean man does not profit much, he shall not suffer at all.

THE CHAIRMAN: Dr. Harrington's paper is now open for discussion, and I see a large number of members who look as if they wish to speak on the question.

MR. BROCK, Athol: Mr. Chairman, I want to ask one question. Of course we are all interested in the practical end of this, and we want to know whether the suggested means of bringing pressure to bear on the milkman is a thing that public sentiment will back up. I understood the speaker to say that the suggested standard would be 500,000 bacteria to a cubic centimeter. Now how does that compare with the good old-fashioned milkman's milk that we heard about?

PROF. HARRINGTON: I think it would compare very favorably with some of the "good old-fashioned milkmen's milk," and not very well with others. Of course, different dairies produce milk of different degrees of cleanliness. It all depends upon the care exercised, the rapidity of cooling, and the care with which the milk is handled afterwards. I don't think that we can say that 500,000 would be an unreasonable standard. It is the one which was adopted in New York, where it worked well.

In Rochester a standard of 100,000 was adopted, and they have had some success in diminishing the percentage of very dirty milk. But my point is that, if we adopt any reasonable standard, such as 500,000, in enforcing that standard we will get a very much smaller number, because if a man is going to take pains to keep his milk clean, so that the number of bacteria will fall below 500,000, the chances are that he is going to reduce it very much below that figure.

MR. BROCK, Athol: What number of bacteria will the ordinary milk that comes in Boston carry, as it is delivered?

PROF. HARRINGTON: I don't know of any recent accounts. As I remember some work done under Professor Sedgwick's eye some years ago, it ranged pretty well in the millions.

THE CHAIRMAN: Perhaps Professor Sedgwick can give us something interesting on this question.

PROF. SEDGWICK: Mr. President and fellow-members, I have been extremely interested in Dr. Harrington's paper, for I doubt if there is any subject to-day more important to the public health, than this question of a reform of the milk supply.

I should differ from Dr. Harrington in one little point. I do believe that the public is beginning to wake up on this subject. He is a little bit pessimistic, and thinks that they don't care. Well, that is true in a large way, no doubt, but I think we are beginning to make some impression on the citadel of ignorance and carelessness in this direction; the attack is coming from trained nurses; it is coming from the physician; it is coming from the sanitarians, and it is coming from the milkmen themselves, who have been some of the most wide-awake in this matter. There are in this community some very progressive milk men, some of whom are in this room at the moment, who have been studying this question and looking into it from various points of view, and I believe that a good deal of progress can be made on the lines that Dr. Harrington has suggested.

In another respect I should differ slightly from Dr. Harrington. He speaks hopelessly of getting the public ever to pay more for milk than they now pay—and I don't wonder he feels so. When we see any talk of an increased cost of milk to anybody—producer, middleman, consumer, or anyone—some of the newspapers simply go wild on the subject, and talk as if a conspiracy was being made to cheat everybody on earth. This is an unfortunate point of view. I have come to the conclusion that there is no hope for the milk industry until we do get people to pay more for milk. I have been working at this matter now for some fifteen years, and I think that my first paper on the subject was read to this Association considerably more than ten years ago. The trouble is we are still in a primitive state in the milk industry.

We are going along just as our ancestors did, expecting to get for six, seven, eight cents a quart the benefit of all the latest conveniences and improvements. Now, that is very unreasonable. We are asking of the milk man many reforms. We are asking him, for instance, to wash his hands before he milks, a thing that never occurred to him in the old days. We suggest that it might be well for him to wet the cow's udder to keep the germs from dropping in. We suggest a uniform. We suggest a lot of things—more ice, cleaner cans, cleaner water. Now, I submit gentlemen, that from the standpoint of the milk producer, it is not fair to expect him to do all these things and get no more money for his milk.

I myself propose, from this time on, in season and out of season, to give lectures whenever I get a chance upon the subject of *ten-cent certified milk*. If I am willing to pay ten cents for a cigar (as I am, and more than ten generally), then I think I ought to be willing to pay ten cents for a quart of decent, clean milk for my family. If any man is willing to pay ten cents for a bottle of beer, or any woman is willing to pay ten cents for a glass of soda or candy, or for some little thing to decorate the table or the house, then I think I ought to be willing as I am, to pay ten cents a quart for milk; and I have issued orders in my house that no milk is to come in regularly that costs less than ten cents a quart. I know that this is advanced ground, and that you will shake your heads and say, "You cannot do it. It is no use. A few dudes may do it, but you will never affect the public generally." But I believe that we shall. I believe that through the influence of the trained nurses, and the physicians, and the public education which we are going to bring to bear on people in the next twenty-five years, people will gradually find, and agree with us, that it is just as nasty to drink nasty milk as it is nasty water, or anything of that kind. We have got to make it understood that dirty milk is nasty milk, and that people ought not to use it, and that it is an anachronism, and an inconsistency to pay ten cents for this, that and the other thing, and then quibble over the two or three cents required between clean and dirty milk. Of course at first this will only effect a limited

number of people, but it will lead to the establishment of model dairies, and model dairies will have their influence over dairies that are not model dairies, and little by little, ten, twenty, thirty, fifty years from now, the milk supply will be cleaned up, as water supplies are gradually getting cleaned up.

Still, when all is said and done, I agree with Professor Smith that we have got to pasteurize milk. Cooked milk is the only *safe* milk, and always will remain the only *safe* milk, for the use of mankind. It will be very slow to come, I dare say, but it interests me quite greatly to know that it is coming a good deal faster than it was. I believe that pauteurizers are being put in by milkmen themselves; they are being put in by philanthropic people in various big cities, to save human life. Little by little the idea is spreading that *raw milk* is apt to be—it is not always, but it is apt to be, *dangerous milk*. And in all sanitary matters I have come to the conclusion that we have got to hold the standard up pretty near the ideal. We don't want a drinking water that is slightly contaminated, or that *may be* contaminated but very likely is not. We don't want a milk that *may be* contaminated with infectious diseases, but very likely is not. There is no middle ground in question of diseases and death, and sooner or later we have got to come up to the ideal.

. I did not mean to speak so long, Mr. President, because there are practical men here, men dealing with the milk of this city, who can tell us just what the bacteria are when the milk comes in, and just what the practical problems and real difficulties are as they see them, and I should very much prefer to hear from them.

MR WHITING: Mr. President, being one of the milk contractors of Boston, I am naturally very much interested in this subject, have listened with intense interest to Professor Harrington and also to the last speaker. I agree with Professor Sedgwick that the first thing to do is to get a better price for milk in Boston. I think when that is done there is not much trouble in getting cleaner milk for this market. We cannot very well, with existing prices, go back to the producers and insist upon a cleaner

condition of things about the farm. We are told at once they are doing already more than they can afford, and I don't know but that it is true. I will say, however, that a great deal has been done in the past two or three years, and a great deal is expected to be done in the next two or three, in the way of getting cleaner milk for this market, and reducing the bacteria. As Professor Harrington said, it is necessary to have the milk thoroughly cooled in order to keep down the bacteria, and that is what we are insisting upon. For the last three years we have put out circulars among our producers saying that we would not accept milk that was not cooled with ice, and we have accomplished a great deal on these lines. We shall insist this coming summer upon taking no dairies that do not use ice in cooling their milk. We know very well from past experience that that is the only way to get a good article of milk into the market, something that will keep the required time. If you gentlemen, or anybody else, can tell us how to get more per quart for milk in this market, we shall be glad to hear from you. If there are enough people, like Professor Sedgwick, who are willing to pay ten cents a quart, they can get milk, I think, just about as they want it.

Mr. Hood: Mr. Chairman and gentlemen, I have been very much interested in the papers read and the discussion this afternoon. A short time ago I noticed some milk which was being served on a table in a large hotel, that seemed to be loaded with bacteria. I noticed it by the peculiar flavor of the milk. There was a large dairy connected with the hotel, and a little later I visited it and found they had engaged the best talent they could secure, to have everything in perfect sanitary condition. They had granolithic floors in the stables, with sanitary base, cement wainscotting on the walls back of the cows, the stable was kept very clean, and they even had a man there during the night so that the floors should be kept perfectly clean. The cows were cleaned thoroughly, and the udders were wiped with a moist cloth before the men began milking; the utensils were sterilized; but by investigating still further, the cause of the bacteria in the milk was easily discovered. The milk was not quickly cooled after milking.

That endorses very strongly the statement that has been made here to-day: that cooling immediately after milking is of great importance. From the commercial standpoint, it is even more important than having everything clean about the stable. To get the best results, we must have everything clean, and then we must have immediate cooling of the milk.

The average farmer and milk dealer wish to do what they are paid for, and as little more as is absolutely necessary. The producer is getting for his milk about $\frac{7}{8}$ of a cent per quart more than he did a few years ago, while the consumer is paying but very little, if any, more than he did a few years ago. That reduction in the margin is bringing hardship upon nearly all the dealers. The smaller dealers and those who cannot do business on the reduced margin are going out of business. Many of the small dealers have already gone out. It is because they cannot pay from one-half cent to one cent per quart more than they did a few years ago and serve their customers at the same price. It is difficult for any of the dealers to do so.

If the standard for cleanliness of milk is to be raised, possibly it can be done along the line of certified milk, reference to which has already been made. We know what the standard for solids in milk is to-day, but what is the standard for its cleanliness? If the Board of Health established some standard for cleanliness, I am very sure all progressive companies will be pleased to come under such regulation. We can then sell milk as certified milk, and such milk will be subject to inspection for cleanliness, as well as for solids. Something can be done almost immediately to fill the demand for clean milk, which already is being furnished by some of the producers. We must be in a position to pay those producers a higher price for their milk. We must pay them considerably more money, and in paying them more we must sell the milk in the city at a higher price than the ordinary milk. That will bring about two prices, as well as two qualities, of milk and it may be best in starting this method that any dealer who may wish shall carry the two grades of milk; one as certified milk, so labeled, and subject to inspection for bacteria and solids, and

the milk not labeled certified milk should be the same milk as is carried at the present time, and subject to present inspection.

I am pleased to hear to-day that there are some men who advocate that higher prices should be paid for milk. The producers do not get enough to give us the article we want, and the consumer ought to understand the value of a superior article.

A few years ago, at the time when nearly all food products were advancing in the market, some of the Boston newspapers had a great deal to say about the price of milk. They greatly damaged the business by advocating no rise in the price of milk. We feel sometimes like saying to some people we will supply them with milk free for their family use, house-to-house delivery, if they will pay a fair price for making the delivery. This would especially apply to many family customers who wish to buy their milk at three and one-half cents per pint; and certainly we believe that deliveries cannot be made for less than about that price per parcel.

There are many large users of milk in Boston whom we should expect to demand the highest quality of milk at a fair price, but it is found they want a fair quality of milk at the lowest price. We all want the best and safest milk for use in our homes, and we must co-operate in any movement to raise the standard.

DR. MILLER: Mr. President, I understood the reader of the last paper to favor a commission. Now, I have just two suggestions to make. I am not in favor of two grades of milk; I am in favor of having pure milk. It strikes me that if we had a State commission, whose business it was to examine milk, suppose some user of milk fancies that the milk he is getting is not pure, a member of that State commission might be called there to examine it. I think it would do a great deal of good to have a State commission and let us have pure milk, and pure milk only. If a poor man is not able to buy milk that is worth ten cents, he had better buy half the quantity. He had better buy a pint and have it pure, than to buy a quart that is impure; and he can weaken it with water. That is one remedy I would suggest. Then here is another suggestion. In the city you have plenty of machinery to enforce any law against adulterated milk, but

in the country towns they don't have that. The remedy in the country, where the milk is produced, will be, first, education. We have got to educate the people, and that education will have to be done through two sources, aside from this milk inspection I have spoken of; one is the family physician, and the other is the teacher. The mass of people think that the doctor and the teacher know a little more than the rest of the people, and they have more influence. Now, if this organization could send out circulars on this point to the physicians, every physician in the commonwealth, and to all the teachers in the commonwealth, we would do more toward educating the people on this subject of pure milk than in any other way.

THE CHAIRMAN: Gentlemen, I think there can be no question but that these educational measures are very serviceable; but they are slow. It is very well to pay more for your milk; I think we should; but you will never find the farmer sending ten-cent milk in here until he is told that he must, until he is told that his poor milk will not be sold in Boston. A few years ago the Boston Board started this question, wrote some regulations, proceeded to put them in force. We wanted the whole State with us and we came into this Association for that purpose. We invited the milk contractors of Boston to come in here with us. They came heartily, stood up and talked like men, business men; they were with us in the proposition for clean milk. It was found that the other boards of health of the State were not quite as fortunate in some respects as the Boston Board, owing to some differences in relationship between themselves and the milk inspectors. This Association had a committee on legislation, and that committee under request went before a legislative committee, and tried to help the rest of the Boards of Health to get a uniform law. We did not exactly get kicked out, but we came away defeated. The Boston Board alone went ahead with its regulation. It has, as has been said, done some good.

The Boston Board is about to take another step, and we would like very much to have the other Boards of the State with us. In union there is strength. While the other Boards of the State may not have comfortable official relations with the milk inspectors of

their cities and towns, they can do this. They have just as much authority to regulate the sale of milk in their town or city as the Boston Board has. We propose to fix some standards. We propose to have the bacterial count reasonably low, and we propose to have the temperature held down to a reasonable degree, as has been indicated here by Dr. Harrington. It can be done. It only needs a will and a union of forces. We are ready to lead off. We hope, through what has been said here to-day, that there will be a general feeling that this is a necessity. It is time that we took another step. It is time that we had cleaner milk. It is very well to sterilize the milk, of course, but why should we encourage laziness and carelessness in the producer and retailer by taking milk in a dirty condition? Let us make them do better work and pay them for it, and then, if we want to sterilize the milk by boiling, let us do it.

I hope that this meeting will bear the fruit that is looked for. I hope we will all have regulations, and will enforce them, against dirty milk.

DR. WORCESTER: Mr. Chairman, if it is in order, I should like to move that the President appoint a committee of three, or five, to draw up a bill to be presented to the present Legislature in this matter, covering the lines of Dr. Harrington's scheme. I think it is an absolute necessity. I have lived in the country as well as in the city, and country milk is just as dirty as city milk. We may get it a little fresher in the country, but it is not as well cared for as it is in the city. The milk as brought here is pretty well iced—has to be, in order to be accepted by our milk dealers in the city. I think it is just as important, if not more so, for the country as for the city, that something of this kind should be done, and have thought so for a good many years, and I am very glad that this has come up now.

THE CHAIRMAN: Perhaps Dr. Worcester does not understand precisely how the law stands. Every Board of Health in this Commonwealth has authority to make a regulation, and enforce it, against dirty milk. The only thing that you would need to do with the Legislature is to secure a better union between the

Boards of Health of the several cities and towns and the milk inspectors of those cities and towns.

DR. WORCESTER: Mr. Chairman, I understand that Boards of Health have absolute power in these matters, and the only thing for them is to feel that they have. If there was a public statute to a certain effect, with a State commission to look after the milk supply especially, I think something more could be done. Then they would feel that they could go ahead better. I know it is the same in respect to the spitting nuisance and a number of other things in the past. The Boards have, under the General Statutes, power in all nuisances, and if they merely say bad milk is a nuisance, they can abate it.

THE CHAIRMAN: If you will secure a law to place every inspector of milk under the kindly care of the Board of Health, and let it stand by him, the difficulty will take care of itself very quickly.

DR. WORCESTER: Mr. Chairman, I will move that such a Bill be brought before the Legislature.

MR. COFFEY: Mr. Chairman, some four or five years ago an attempt was made, as the Chairman has stated, to get a uniform law passed, by which Boards of Health might have the right to appoint the inspectors of milk. That bill was before the Legislature, and I believe met the opposition of the farmers of the State, and was defeated. Now, as far as I know, there are but three or four cities in the State that have control over the inspectors of milk. Boston has it in its charter. Lynn has a special act. Springfield, I believe, has also a special act. The city of Lowell, by an arrangement made with the City Council, has control over the inspector of milk. Those are the only cities, so far as I know, in the State, that have anything whatever to do with the inspection or licensing of milk dealers or peddlers. I know at Worcester we have absolutely nothing whatever to do with the milk, except what might be given us under the General Statutes, which allow Boards of Health to make rules and regulations governing anything that may affect the public health.

With an inspector of milk appointed by the Mayor and confirmed by the Board of Aldermen, who has not any interest in the milk question other than simply licensing and making tests, looking to see whether the milk is adulterated or not, the Boards of Health of course are situated so that they cannot very well interfere with the inspector, who holds a political appointment from the Mayor. He has no interest in the subject from a sanitary standpoint. His thought and his action does not run in that direction. That is only natural. He is not trained to look at it from that point of view.

I remember when this subject was up some five or six years ago in this meeting, and I think it was at the annual meeting, a member here from North Adams discussed the subject and was very radical in his utterances on the question of the purity of the milk supply. He pledged himself here that in his own town of North Adams he would see that the milk law was strictly enforced, and that milkmen would be obliged to comply with the terms of the rules as laid down by the Board of Health of that town. At that meeting there were some representatives of the farming interests. After the meeting was over I heard them express, in very decided terms, what they thought of that man from North Adams, and with it they implied that when they got at him he would no longer be a member of the Board of Health of that town. I subsequently was interested enough to inquire if that threat was carried into execution, and I found that it was; that the member who expressed himself so radically at the meeting here five years ago, when his term expired as a member of the Board of Health of North Adams, was not reappointed.

It may be that, as Professor Sedgwick has said, and also as Professor Harrington has said, a change has taken place in the opinions of the milk producers, as well as the middlemen, who send the milk to the consumers. That may be; I have not any means of either proving or disproving it. I certainly know that four or five years ago the feeling among the farmers was not at all favorable to giving Boards of Health the control of the milk business. Lynn at that time, I remember, made some rather radical rules, and stirred up the entire farming interests.

The Lynn Board of Health has control of the licensing of milk peddlers. It is my opinion that until you can get a law passed by which Boards of Health will have the right to license the peddlers, and in that way have some control over them, you cannot do much toward improving your milk supply. The State Board of Health has certain powers now about the adulteration of milk; it might be given additional powers, so that it might examine and look into the dairies. If that was done, then probably your milk supply would improve. But my own experience has been that some of the milk that came from the farms was in very bad condition.

It was only about six weeks ago that I had occasion to go to an adjoining town to the city of Worcester to look up typhoid fever. We have a practice in Worcester that when we get one or two cases of typhoid fever on any milkman's route, we look him up. The inspector reported to me two cases on the route of one of the milkmen who supplied milk to Worcester, and I drove out to the adjoining town where his home was, and I found a very dirty condition of affairs. It was a dirty, slack, run-down-at-the-heels place. The farmer was dirty and unkempt, and his wife was as bad, and the whole place had a look of poverty. I found his son down with typhoid in the house, and his driver had been sent to the hospital, also with typhoid; no precautions whatever had been taken toward caring for those in a sanitary way, or toward keeping that milk supply pure. I had to take arbitrary means. I simply told them that unless they did what I wanted them to do, I should publish in the papers of Worcester the fact that there was typhoid in their house, and also the dirty condition of the place, and ruin their business; that I did not want to do that, and if they would carry out the orders that I was there to give, I wouldn't interfere with their business. They adopted my views. The milk supply was moved, with all the utensils, to another farm, where it was clean, to be cared for. But that only shows how careless and how ignorant and how dirty some of the farms are from which the supply of milk goes out to the various cities and towns of the State.

PROF. THEOBALD SMITH: Mr. President, when this question of the milk supply came up in this Association some five or six years ago, the agitation against tuberculosis was uppermost, and everything appeared to revolve about the tubercle bacilli in the milk. Cleanliness was entirely subordinated to it, although I urged the fact that there were half a dozen other diseases, that were fully as important from a sanitary standpoint, that might be disseminated in milk. At that time I felt that the tubercle bacilli in the milk had very little to do with tuberculosis, and I felt very lukewarm in the whole matter; but it seems to me now that we have come to the position that dirty milk is likely to contain a variety of disease germs; we have attained the right standpoint from which to begin our agitation over again. I think also that the problem of the pasteurization of milk should not be lost sight of, and I have no doubt that it will become in the future one of the most important safeguards. In order to put this matter into motion, I move that a committee of three be appointed by the Chair to consider the whole question of the sanitary bearing of milk, and to report to this Association at some later meeting, because there are so many questions involved, among which the price and food value of milk are of considerable importance.

DR. MILLER: Mr. President, I heartily second that motion.

THE CHAIRMAN: It is moved and seconded that the Chair appoint a committee of three to take the question of milk sanitation up and report to the Association at a subsequent meeting.

(The motion was adopted.)

THE CHAIRMAN: The Chair will take time to appoint this committee and will call on Professor Harrington to close the discussion.

PROF. HARRINGTON: Mr. President, it may be, as Professor Sedgwick has said, that I am somewhat pessimistic in regard to public interest in this matter of clean milk; but if I am, it is because I have been preaching clean milk for a number of years, and certainly Professor Sedgwick has been preaching

it most eloquently for the last fifteen years, and yet I fail to see that the public shows any particular interest. To be sure, Professor Sedgwick is willing to pay ten cents, and probably most of us are; but the general public is *not* willing to pay ten cents. I know of a number of milkmen in this city who have tried to put out pasteurized milk at ten cents a quart. They got as clean milk as they could; they put in a lot of expensive apparatus; they pasteurized their milk and charged ten cents a quart, and that is all they could do; they could charge it, but they could not get it, and they have gone out of business. We cannot interest the public in paying ten cents. Men may be willing to pay ten and fifteen and more for their cigars and their beer, but only a very small minority are willing to pay ten for their milk. Two weeks ago I was at a meeting held on this very subject, by the County of Albany Medical Society. I heard there that there is one model dairy, a few miles out from Albany. The cows are well looked after; the milk is examined periodically at the Bender Institute. The number of bacteria in it is very much under 10,000, I think about 4,500. The owner charges ten cents per quart, and has succeeded in getting a trade of forty quarts per day in the whole city of Albany, and that is all. I think that I am less pessimistic on the whole than Professor Sedgwick is. I say, let us take hold of this thing; I believe we are going to accomplish something, and we are going to accomplish it pretty soon. It is going to be a matter of slow growth to attain perfection; but I don't believe, as Professor Sedgwick does, that it is going to take fifty years. He is satisfied if in fifty years we have made some progress. Well, some of us will not be here in fifty years, but I expect to see a good deal of progress within five years. When Boards of Health take this matter up and do the thing in earnest, as will be done in Boston, I expect to see good progress in less than five years—and very marked progress, you will find. I think that in this whole matter we certainly shall have the cordial co-operation of the milk contractors. It is for their interest to have clean milk. If they can induce the farmer to send them clean milk, they will have less milk souring on their hands. If the consumer will pay ten cents a quart, they can afford to give the farmer more for his product.

In the matter of commissions, spoken of by Dr. Miller, I think that the only possible way of running a milk commission is for men who are interested to take hold and form an organization which will not be political, raise whatever funds are necessary, employ a veterinarian, a chemist, perhaps a physician, and a bacteriologist, and make periodical examinations of milk. When milk falls within certain limits of bacterial impurity, say 10,000 per cubic centimeter, which is the standard set in Philadelphia, let the commission give the milkman a certificate. As long as the milkman lives up to that standard, let him keep his certificate; as soon as his milk falls off, let his certificate be taken away.

DR. NORTON, Norwood: Mr. Chairman, I want to add just a word in view of Dr. Harrington's remarks. He seems to think that there are no people that pay ten cents a quart for milk. I want to say that in an adjoining town, in Westwood, there is a first-class dairy. I do not recall the owner's name; but at any rate it is there, and I have visited it. That man's milk is sold in Dedham and Jamaica Plain—those are two places—at ten cents a quart, and he sells all he can produce. I just add these remarks to make Dr. Harrington more hopeful.

PROF. HARRINGTON: Jamaica Plain is a center of great intelligence. It is willing to pay ten cents a quart.

THE CHAIRMAN: The Chair would announce as the committee Prof. Theobald Smith, Prof. Charles Harrington and Prof. William T. Sedgwick.

PROF SEDGWICK: Mr. President, I am quite likely to be out of the city a good deal for the next two or three months, and besides, it seems to me desirable that the committee should be somewhat differently constituted. I should like to withdraw my name. My objection is that you have got three professors on the committee. Professors are all very well in their place, but it seems to me three of them are a little too many.

THE CHAIRMAN: Two out of the three appointed are begging off. The Chair will make up this committee and notify later.

If there is no other business to come before the meeting, a motion to adjourn will be in order.

MR. COFFEY: I move we adjourn.

(The motion prevailed, and the Association adjourned.)

The next meeting will be held on the last Thursday in April (April 28), 1904.

ABSTRACTS, REVIEWS, NOTES AND NEWS.

Boards of Health are asked to send to the Managing Editor notes of not more than one hundred and fifty words relating to new regulations passed, legal cases prosecuted, outbreaks of infection, unusual problems encountered, or other matters the publication of which may further the attainment of the objects of the Association.

References are indicated by numbers. See list at end of column.

THE PRESENT PRICE OF DIPHTHERIA ANTITOXIN.—The advance in price widely heralded of late seems to have a real basis in fact.

Hitherto two grades of antitoxin have been on the market, the cheaper grade being the more dilute, so that 3,000 units of the cheaper grade occupied more actual bulk, and was to that extent less desirable than 3,000 units of the other. There is little question that unit for unit the cheaper grade is just as effective as the dearer.

The cheaper grade has now been withdrawn from the market entirely. This leaves the poor man compelled to buy the dearer grade or go without. It is true that this dearer grade is not now so dear as it was when the cheaper grade was also available, but it remains dearer than the cheaper grade was when it could be obtained. Thus 3,000 units (dilute) used to cost about $4.50; now 3,000 units (concentrated) costs $5.00. The mere decrease in bulk of the latter over the former is not worth the difference.

When it is known that the discount to the retailer offered by antitoxin manufacturers has been 25 per cent.; that the discount to wholesalers has been 33⅓ per cent.; that the Chicago Board

of Health is said to have received a discount of 62 per cent., and that the Massachusetts State Board of Health has made for $7,500 what private manufacturers at market rates would sell for $80,000, it will easily be seen that the antitoxin manufacturers are not exactly trembling on the point of bankruptcy as yet. (See 14.)

MILK IN INFANT FEEDING.—Drs. W. H. Park and Emmet Holt summarize their paper on this subject in the *Medical News* of Dec. 5, 1903, as follows:

The observations here recorded were made upon the groups of infants for periods of about three months only, and the conclusions drawn relate especially to the more immediate effects of the milk.

1. During cold weather neither the mortality nor the health of the infants observed in the investigation was appreciably affected by the kind of milk or by the number of bacteria which it contained. The different grades of milk varied much less in the amount of bacterial contamination in winter than in summer, the store milk averaging only about 750,000 bacteria per c.c.

2. During hot weather, when the resistance of the children was lowered, the kind of milk taken influenced both the amount of illness and the mortality; those who took condensed milk and cheap store milk did the worst, and those who received breast milk, pure bottled milk and modified milk did the best. The effect of bacterial contamination was very marked when the milk was taken without previous heating; but, unless the contamination was very excessive, only slight when heating was employed shortly before feeding.

3. The number of bacteria which may accumulate before milk becomes noticeably harmful to the average infant in summer differs with the nature of the bacteria present, the age of the milk, and the temperature at which it has been kept. When milk is taken raw, the fewer the bacteria present the better are the results. Of the usual varieties, over 1,000,000 bacteria per c.c. are certainly deleterious to the average infant. However, many infants take such milk without apparently harmful results. Heat

above 170° F. (77° C.) not only destroys most of the bacteria present, but, apparently, some of their poisonous products. No harm from the bacteria previously existing in recently heated milk was noticed in these observations unless they had amounted to many millions, but in such numbers they were decidedly deleterious.

4. When milk of average quality was fed sterilized and raw, those infants who received milk previously heated did, on the average, much better in warm weather than those who received it raw. The difference was so quickly manifest and so marked that there could be no mistaking the meaning of the results. The bacterial content of the milk used in the test was somewhat less than in the average milk of the city.

5. No special varieties of bacteria were found in unheated milk which seemed to have any special importance in relation to the summer diarrhœa of children. The number of varieties was very great, and the kinds of bacteria differed according to the locality from which the milk came. None of the 139 varieties selected as most distinct among those obtained, injured very young kittens when fed in pure cultures. A few cases of acute indigestion were seen immediately following the use of Pasteurized milk more than thirty-six hours old. Samples of such milk were found to contain more than 100,000,000 bacteria per c.c., mostly spore-bearing varieties. The deleterious effects, though striking, were not serious nor lasting. At the present time there is in New York City, no general sale from stores of "Pasteurized" or "sterilized" milk, so that it is here very rare for such milk to be used thirty-six hours after heating.

6. After the first twelve months of life, infants are less and less affected by the bacteria in milk derived from healthy cattle. According to these observations, when the milk had been kept cool the bacteria did not appear to injure the children over three years of age, at any season of the year, unless in very great excess.

7. Since a large part of the tenement population must purchase its milk from small dealers, at a low price, everything possible should be done by Health Boards to improve the character of the general milk-supply of cities by enforcing proper legal re-

strictions regarding its transportation, delivery and sale. Sufficient improvements in this respect are entirely feasible in every large city to secure to all a milk which will be wholesome after heating. The general practice of heating milk which has now become a custom among the tenement population of New York is undoubtedly a large factor in the lessened infant mortality during the hot months.

8. Of the methods of feeding now in vogue, that by milk from central distributing stations unquestionably possesses the most advantages, in that it secures some constant oversight of the child; and since it furnishes the food in such a form that it leaves the mother least to do, it gives her the smallest opportunity of going wrong. This method of feeding is one which deserves to be much more extensively employed, and might, in the absence of private philanthropy, wisely be undertaken by municipalities and continued for the four months from May 15 to September 15.

9. The use, for infants, of milk delivered in sealed bottles, should be encouraged whenever this is possible, and its advantages duly explained. Only the purest milk should be taken raw, especially in summer.

10. Since what is needed most is intelligent care, all possible means should be employed to educate mothers and those caring for infants in proper methods of doing this. This, it is believed, can most effectively be done by the visits of properly qualified trained nurses or women physicians to the homes, supplemented by the use of printed directions.

11. Bad surroundings, though contributing to bad results in feeding are not the chief factor. It is not, therefore, merely by better housing of the poor in large cities that we will see a great reduction in infant mortality.

12. The observations indicate that close percentage modification of milk, although desirable in difficult cases, is not necessary to obtain excellent results with the great majority of infants, and that a certain adjustment of a healthy infant to its food is usually soon secured.

13. While it is true that even in the tenements the results with the best bottle-feeding are nearly as good as average breast-feeding, it is also true that most of the bottle-feeding is at present very badly done, so that as a rule the immense superiority of breast-feeding obtains. This should, therefore, be encouraged by every means, and not discontinued without good and sufficient reasons. The time and money required for artificial feeding, if expended by the tenement mother to secure better food and more rest for herself, would often enable her to continue nursing, with advantage to her child.

14. The injurious effects of table food to infants under a year old, and of fruits to all infants and young children in cities, in hot weather, should be much more generally appreciated.

CAISSON DISEASE.—Experiments by MacLeod and Hill, London City Hospital Laboratory, show that the fatal effects of decompression usually result from the setting free in the blood of gases with which the blood had become saturated during compression, thus permitting "air embolism." Very slow decompression obviates this by permitting the gradual escape of the gases in amounts too small to form definite bubbles. Besides air embolism, oxygen poisoning and excessive loss of body heat, the latter due to the increased conductivity of air when compressed, lower the vitality of the body. According to Dr. Frank Roth, air embolism has been noticed in men working in the Cleveland crib. Dr. W. T. Howard of Cleveland has observed air bubbles in the brain and cord in fatal cases. (1.)

RECENT LEGISLATION. (3.)

TOY PISTOLS.—South Carolina (ch. 79, 1903) prohibits the sale of any toy pistol in which caps or cartridges are used, or of any caps or cartridges therefor, under a penalty of $100, or imprisonment for thirty days.

HYDROPHOBIA.—Texas (ch. 125, 1903) appropriates $5,000 for a Pasteur Department at Austin, under the control of the State Lunatic Asylum.

TOBACCO.—Utah (ch. 135, 1903) makes it a misdemeanor for any one under eighteen to have in their possession any form of tobacco or opium or other narcotic.

INFECTIOUS DISEASE HOSPITALS.—Utah (ch. 36, 1903) provides that no infectious disease hospital shall be located within twenty rods of any public highway, or within quarter of a mile of any open running water used for domestic purposes as a public water-supply.

TYPHOID FEVER.—Utah (ch. 81, 1903) makes the omission to disinfect the excreta of a typhoid patient a misdemeanor. Also it is a misdemeanor on the physician's part to fail to instruct the attendants how to disinfect the feces. He must also satisfy himself that his instructions are carried out.

SCHOOLS.—Pennsylvania (ch. 132, 1903) requires the disinfection of schoolhouses at intervals of not more than two weeks. The system adopted in each place must receive the approval of the local Board of Health, or if there be no such board, of the State Board of Health.

North Carolina (ch. 690, 1903) excludes from school children in families where other members are suffering from certain infectious diseases, and excludes them also for two weeks after the death, recovery or removal of the patient. Mumps and the itch are added to the infectious list.

VACCINATION.—Oklahoma (ch. 2, 1903) appropriates $2,500 for the manufacture and free distribution of vaccine in the territory by the Oklahoma Agricultural Experiment Station at Stillwater.

South Dakota (ch. 223, 1903) prohibits any board, physician, or person from compelling vaccination by physical force. No child successfully vaccinated within five years shall be prevented from school attendance.

Minnesota (ch. 299, 1903) permits school attendance in the absence of vaccination, except during epidemics of smallpox, and even then a physician's certificate of physical unfitness exempts the child from vaccination.

TUBERCULOSIS.—Minnesota (ch. 316, 1903) provides a State sanitarium for consumptives.

New Mexico (ch. 17, 1903) exempts from taxation for six years all sanitarium property, the construction of which is begun within a year of the passage of the act, if not less than $100,000 is expended on it within two years of such passage.

New York (ch. 638, 1903) provides that the consent of a town must be obtained before the establishment within it of any sanitarium of any description for consumptives.

POISONOUS ADVERTISING SAMPLES.—Both New York (ch. 494, 1903) and North Dakota (ch. 81, 1903) forbid the distribution of free samples of drugs, medicines, etc., about streets, premises, etc., in a manner such that children may get at them.

LEGAL DECISIONS.

VACCINATION OF PUBLIC SCHOOL CHILDREN. — In the case of Viemeister of New York City, who sought to compel the admission of his child to school without vaccination, on the ground that the statute requiring vaccination before admission was unconstitutional, the Appellate Division of the New York Supreme Court upheld the statute, declaring it constitutional, since it operates equally on every person who is or may desire to become a pupil in the public schools, and affords equal protection to all. (4.)

It will be remembered that a similar decision was reached recently in Massachusetts (this JOURNAL, October, 1903).

CHRISTIAN SCIENCE AND MEDICAL ATTENDANCE. — Under a clause of the Act for the Prevention of Cruelty to Children, which makes it a misdemeanor to willfully neglect a child in a manner likely to cause unnecessary suffering or injury to its health, Lord Russell, Lord Chief Justice of England, on appeal, upheld (1899) a conviction for manslaughter in a faith-healing case where death had resulted. In Canada the Ontario Court of Appeals has decided recently, in a Christian Science case, that medical attendance is a "necessary," the failure to provide which

for children under sixteen years constitutes a misdemeanor; where death follows, it is manslaughter. (Abs. 9.)

A recent ruling similar to the above, in New York State, was commented on in our last issue. In contrast to this, the Supreme Court of Ohio is reported as recently acquitting the parents of the charge of manslaughter, consequent on the death of their child under Christian Science treatment. (10.)

Judge Cleaveland of New Haven recently refused to appoint an Eddyite as guardian to a nine-year-old child, as the result of some questions asked as to the proposed conduct of the prospective guardian in the case of serious illness of the child. (8.)

TYPHOID FEVER NOT FROM GARBAGE.—A man recently brought suit against the city of Philadelphia, alleging that members of his family had contracted typhoid fever from foul gases arising from garbage. Expert testimony was adduced in defense, showing that typhoid fever is not introduced by breathing impure air. The man lost his suit. (5.)

It is curious to note from time to time how obstinately the exploded ideas concerning the relation of bad odors and specific diseases persist in the lay—sometimes, alas, also in the medical —mind.

BRIBING THE PUBLIC TO PROTECT ITSELF.—The City Council of the French community of Rouen has passed an ordinance which not only bestows $2.00 on the first person reporting a new case of typhoid fever, but further offers $4.00 to the infected family thus "betrayed" if they will agree to follow the directions of the Board of Health.

Two members of the City Council only voted against this ordinance. Both of these were physicians. (14.)

This legislation certainly deserves to be compared with that of Utah, quoted in another column, which provides penalties for the physician who fails to give prophylactic instruction in typhoid fever, and for the householder who fails to carry out such instructions when received.

THE EYES OF SCHOOL CHILDREN.—At the last annual meeting of the American Medical Association, the following resolution was passed by the House of Representatives, at the suggestion of the Ophthalmologic Section:

Resolved, That it is advised by the American Medical Association that measures be taken by the various school authorities and boards of edacation, boards of health, and, if possible, state legislators, to secure the examination of the eyes and ears of all school children in this country, with a view to the suitable treatment, for the relief of ophthalmologic and otologic imperfections. (12.)

PROPER SUPPORT OF THE WEIGHT OF THE CLOTHING IN CHILDREN.—Dr. Joel E. Goldthwait recommends that the clothing of children, too often suspended, through the waist, from the outer part of the shoulder, should be suspended from the inner part of the shoulder, next the neck. He advises narrow-backed, high-necked, full-fronted waists, with bands attached, fastened in front to a broad waist belt, passing over the shoulders near the neck, crossing each other in the middle of the back, the back ends attached to the waist belt at the sides over the hips. At this point, and not, as is usual, at the front, the stocking suspenders should be attached.

For summer wear, a skeleton waist, consisting alone of the bands described, connected across the back of the neck by another band, to prevent slipping, is recommended. Further suggestions are also made, for special cases. He adds that while these simple apparatuses will not serve universally for the prevention and treatment of round shoulders in children, they are of real value in many cases. (11.)

SCHOOL AND SPINAL CURVATURES.—Schulthess denies that the school is the only or even the principal cause of lateral curvature and round shoulders, on the ground that many of such cases are seen well advanced before the school age. He says that certain curvatures are especially favored by school occupations, the position in writing giving to the spine of a child who is

naturally disposed to yield toward the left the opportunity to assume this position and to maintain it for long periods. Curves whose beginnings were indicated before the commencement of school life are accentuated. Sitting, the lack of exercise, etc., further abnormal development, but the school is not entitled to all of the blame. In prophylaxis he recommends short hours, regular gymnastic exercise, hourly pauses, proper illumination, suitable furniture, perpendicular writing and frequent physical examination of the children. Decidedly deformed children should be put in special classes. (Abs. 11.)

THE UNCONSCIOUS DEAF.—E. Felix (*La Semaine Medicale*, April 1, 1903) tabulates examinations of 1,050 adults under fifty years of age, and 1,038 children under twelve. Two hundred and ninety adults had hearing defective from disease, twenty-two of these only being aware of the defect. Among the children, 327 were affected, only twelve of these knowingly so. Prophylaxis in infectious diseases and the medical examination of the ears of school children are urged. (Abs. 6.)

TRAINED NURSES FOR PUBLIC SCHOOL SERVICE and for visiting contagious disease cases have been employed by the New York Board of Health since June, 1903.

Municipal district nursing, under the control of a Board of Health, is a departure which promises well under favorable circumstances. As adjuncts to the Medical Inspection of Schools the nurses visit at home the children excluded for minor affections, trachoma, pediculosis, ringworm, eczema, etc., and instruct the mothers as to treatment. (8.)

GONORRHEA IN INFANTS.—From experience in the Babies' Hospital of New York, Reuel B. Kimball concludes that gonorrhea prevails widely amongst infants and children, especially in institutions where many children live together. It takes the forms of ophthalmia, vulvo-vaginitis, and pyæmia. Careful physical and microscopical examination and complete isolation are necessary to its eradication and exclusion from hospitals

where infants are cared for. Health authorities, he thinks, should include gonorrhea amongst the acute infectious diseases of children. (8.)

PROPHYLACTIC DISINFECTION OF NOSE AND THROAT FOR MEASLES AND SCARLET FEVER.—Egart (Zeit. f. Hyg. u. Infek., 1903, p. 196) urges the value of sprays and inhalations for the noses and throats of children in hospitals or institutions, as preventing the development of these diseases in exposed persons and in lessening the severity of the disease when contracted. The earliest localization of the infective agents seems to be in the upper respiratory tract, and the author offers statistics to show the effectiveness of his methods. He advises lime water with an equal part of water, 3 per cent. boric acid solution, .05 per cent. tri-chlorid of iron, and 3 per cent sodium chlorid solution, using "all four solutions alternately for five minutes twice daily." (5.)

FALSE VACCINATION SCARS.—In a late issue of *Medical Talk for the Home*, an organ said to be maintained by the Peruna Company, there occurs an article advocating the use of nitric acid to form scars on the arms of children, which scars, the writer says, pass as vaccination marks. The writer tells physicians not to say or certify that vaccination has been performed in such cases, but merely to show the scar to inquirers and let the scar deceive them. He would not wish them to lie about it though. (12.)

The morality which recommends acting a lie is not superior to that which recommends straight lying, and acting a lie which one has not the courage to tell, is the meanest form of lying.

Boards of Health will do well to watch for nitric acid scars on the arms of the unfortunate offspring of the disciples of this writer, and should make an example of the first responsible person caught thus fraudulently evading the statutes.

TYPHOID FEVER FROM A NATIONAL STANDPOINT.—Dr. John S. Fulton, in discussing the general subject of typhoid fever, reiterates and emphasizes, from careful statistics, the prin-

ciple that typhoid fever is a rural rather than an urban disease. He attributes this to the greater carelessness regarding typhoid excreta in country districts. He thinks that the physician recognizes only 60 per cent. of the total cases, and that although the lack of laboratory facilities for diagnosis accounts for some of these failures, the general lack of realization of the ubiquity and perennial activity of the disease is more at fault. (13.)

DETECTION OF TYPHOID BACILLI IN WATER.—The recorded cases of successful isolation of undoubted typhoid bacilli from water supplies are few in number. Loesener (Arb. a. d. kais. Gesund., 1895, p. 207) isolated them from the laboratory tap water of the Hygienic Institute at Berlin. Remlinger and Schneider (Ann. de l'Inst. Pasteur, 1897, p. 55) asserted the ubiquity of, and isolated frequently what they considered to be this organism, but their results are doubtful. Hankin (Cent. f. Bakt., 1899, p. 554) found typhoid bacilli-like organisms in India. Kuebler and Neufeld (Zeit. f. Hyg., 1899, p. 133) report finding typhoid bacilli in a shallow well, the absence of colon bacilli suggesting that the well has been infected through urine rather than through feces. Genersich (Cent. f. Bakt., 1900, p. 241) isolated eleven cultures from suspected cisterns. Sischer and Flatau (Ibid., 1901, p. 329) apparently obtained undoubted typhoid organisms from a well at Rellingen. Sion and Negel (Ibid., 1902, p. 480) found para-typhoid bacilli in water. (5.)

In this country Wesbrook isolated typhoid bacilli from the water supply of Minneapolis by passing the water through a Pasteur-Chamberland filter and testing the material filtered out. (Minn. State Board of Health Reports, 95-98.)

The disappearance of the bacilli from infected water supplies before investigations are set on foot, due to the non-survival of these organisms in water, is usually given as the explanation for the infrequency of their isolation.

TYPHOID FEVER IN LOWELL, MASS.—The city water consists of artesian well water, pumped to the city reservoir to secure pressure. The manufacturing companies have a reser-

voir of their own, thirty feet higher than the city reservoir. The pipes from the two reservoirs intersect, a flap valve, kept closed usually by the greater pressure of the corporation supply, separating the two streams. In case the corporation reservoir were lowered by excessive draft, the flap valves would open under the city pressure and the corporation pipes thus would be replenished.

On July 18, 1903, a large fire reduced the corporation supply to the point where the flap valves opened as designed, but when later the corporation reservoir was being refilled by pumping, the flap valves, which were supposed to close under the increasing corporation pressure, remained open long enough (seven hours) to permit 500,000 gallons of Merrimac River water (at the time, very strongly polluted with Lowell sewage), or about one-twelfth the average daily supply, to enter the city service pipes. About August 1, or fourteen days later, typhoid cases began to take to bed. A total of 136 cases was reported in August, 38 in September. Between July 20 and August 1 many cases of enteritis and gastroenteritis occurred, many of which recovered. On July 29, the first bacterial examination of the city water after the admission of the Merrimac River showed only the usual low bacterial content, but *B. coli* was present (in 100 c.c.) in two samples. On July 31st no *B. coli* were found in four 1,000 c.c. samples tested. In this epidemic the incubation period of the first cases was fourteen days (to going to bed). The maximum number going to bed in any one day was seventeen, on August the 12th, twenty-five days after the accident, and fourteen days from the only finding of *B. coli* in the city supply. The mains were flushed on July 29th, just after the collection of the polluted samples. The worst of the outbreak was over by August 22d, after which comparatively few cases occurred, a certain number of which were doubtless direct case-to-case infections. (1.)

TYPHOID FEVER IN SPRINGFIELD FROM SPRINGS.—A number of cases of typhoid fever in Springfield recently were traced to the use of contaminated springs, the water from which was bought by citizens and used in preference to the city supply,

because the latter, although sanitarily good, possessed an objectionable color. The State Board of Health, on analysis, condemned seven springs, five of which were in the Springfield Park System. The owners of several other springs were warned that their springs were not up to the standard.

WILLIAMSTOWN TYPHOID FEVER.—Dr. George A. Soper, the sanitary engineer who investigated the Ithaca (N. Y.) epidemic for the New York State Board of Health, reports that the Williamstown epidemic resulted from infected cream eaten with breakfast food. A can of this cream was placed in a vat of infected water to cool, and became accidentally contaminated therefrom.

TUBERCULOSIS AND THE HOME.—Dr. Wm. Osler, at the Phipps Institute, Philadelphia, Dec. 3, 1903, gave the second of the series of addresses now being conducted there on this subject. Among the essentials in combating the disease the speaker included educational campaigns, compulsary notification, increased power for Boards of Health, permitting the cleaning out of notoriously bad unsanitary localities, and the compelling of good buildings to replace these. Osler states that 98 per cent of all cases must, after all, be treated at home, that the medical practitioner is here the "man behind the gun," and that early recognition and immediate masterful treatment are the main points for him. (2.)

PROTOZOA IN SCARLET FEVER.—Dr. F. B. Mallory, at a meeting of the Boston Society of the Medical Sciences, Dec. 15, 1903, demonstrated, in the skin of four fatal scarlet fever cases, bodies not unlike, but much larger than, the well-known organism of malaria. Dr. Mallory, while expressing his personal belief that these bodies are protozoa, and that they are the cause of scarlet fever, made it clear that he did not assert the establishment of these beliefs by complete proof.

PNEUMONIA IN NEW YORK.—Dr. Thomas Darlington, the new Health Commissioner, acting with his recently appointed honorary advisers, Dr. Lederle, former Health Commissioner, and

Dr. Chandler, has begun a crusade of cleaning public buildings, schoolhouses and sidewalks, preventing spitting, and enforcing heating and ventilation of street cars, in order to check the outbreak of pneumonia, the deaths from which reached 899 in the last five weeks of 1903, as against 586 for the corresponding period of 1902. (14.)

INDIANA HEALTH OFFICERS' SCHOOL.—The Indiana Legislature of 1903 authorized the State Board of Health to require a certain sanitary training of the health officers, and the holding of a school for them. There are 516 such officers. Two schools annually are held—one for county and city health officers; one for town officers. Practical prevention of disease is considered. The first division of the school was held in June, 1903, the other in December. (2.)

A LEAGUE AGAINST MOSQUITOES.—Under the auspices of Governor Murphy, of New Jersey, a national association was organized in December, 1903, with delegates from several states and from the Department of Entomology at Washington, to formulate plans for the extermination of the mosquito. (3.)

PLAGUE PROPHYLAXIS IN INDIA ABANDONED.—It is reported that the opposition of the natives to all measures taken against the plague by isolation, segregation, and inoculation has at last led the English Government in India to give up attempts to reduce the mortality by these methods, since the Government found that it was undermining its own power amongst the ignorant and bigoted peoples, over 2,000,000 of whom have died of the disease within the last few years. Commerce also has suffered greatly. (3.)

It is not only in India that ignorance and bigotry sometimes reduce almost to despair those who attempt to combat infectious disease. With Ithaca, Butler and Philadelphia in mind, and recalling also the recent smallpox flurry throughout most of this country, we cannot yet hold ourselves wholly superior to our lesser brethren of the older race.

DUNBAR'S ANTITOXIC SERUM FOR HAY FEVER.—A. W. MacCoy tested Dunbar's serum in fifteen cases, his observations relating to periodic attacks, and extending over July, August and September, 1903, with admirable results. The serum was applied with a pipette to the eyes and to the nasal mucous membrane. (7.)

THE "HOLY GHOST AND US" SOCIETY was in strict quarantine in Maine recently, on account of the number of smallpox cases in its membership. Their religious beliefs preclude medical measures, and they disseminated the disease widely in that region. (5.)

NEW ORLEANS PASTEUR INSTITUTE.—It is reported that the Pasteur treatment for Rabies is to be established in a new department of the Charity Hospital in New Orleans.

THE CLEANSING POWER OF SOAP.—H. W. Hillyer (*Journal Am. Chem. Soc.*, XXV, p. 511) reviews at considerable length the reasons heretofore advanced as to why soap cleanses. He considers such theories as "the alkali set free by the hydrolysis of the soap acts on the fat to remove it by a process of saponification" and refutes this and other less common ideas by logic, by experiment or by both, and finally concludes that the cleansing power is "largely or entirely to be explained by the power which it has of emulsifying oily substances; of wetting and penetrating into oily textures; and of lubricating texture and impurities so that they may be removed easily. It is thought that all of these properties may be explained by taking into account the low cohesion of the soap solution and their strong attraction, adhesion or affinity to oily matter, which together cause the low surface-tension between soap solution and oil."

The same author suggests "A Method of Grading Soaps as to their Detergent Power," (*Journal Am. Chem. Soc.*, XXV, p. 1206) based on his conclusions as given above.—*B. R. Rickards.*

(In the Nov. issue of the same journal F. G. Donnan says he published methods and conclusions similar to these in 1899.)

THE VALUE OF TESTING CHEMICAL SUPPLIES.—Every Board of Health should realize the importance of having

such substances as chloride of lime, formalin, peppermint, etc., tested chemically before buying in bulk. The value of such a procedure is very evident. If a dealer understands that the goods he sells are to be subjected to chemical analysis and are likely to be rejected if they do not prove to be pure and up to the proper standard in strength, he invariably ships the very best, leaving the poorer grades to be disposed of to those Boards that make no test.—*B. R. Rickards.*

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SANITARY ENGINEERING NOTES.

ROBERT SPURR WESTON, M.A.

DIARRHŒA AND POLLUTED WATER.—While many epidemics of typhoid, such as the recent unpardonable case at Butler, have been caused directly by a polluted water-supply, a wide spread epidemic of diarrhœa due to this cause is extremely rare, if not unprecedented. J. C. Thresh describes an epidemic in Chelmsford, Eng., which began suddenly July 25, 1903, and ended as abruptly on August 25. During one month there were 1,400

cases among persons of all ages and classes and both sexes, of whom fourteen—thirteen of whom were young children—died. The town water, which was from an unimpeachable well, was stored in an open reservoir, so placed in the ground that it was subject to surface pollution, especially during and after heavy rains. On July 22, two days prior to the outbreak, a storm occurred, washing into the reservoir the manured surface of a nearby garden plot. No cases occurred outside of the region supplied by this water. Results indicate that more care should be taken in the design and care of open reservoirs. In this country covered reservoirs for ground water are always to be desired, on account of growths of algæ, which are almost sure to occur in open reservoirs.

Extension of the Lawrence Filter Plant.—The plans for the new city filter have been completed, and it is said that work will probably be started this year.

Proposed Sanitary Legislation in New York State.—Senator Stuart of Ithaca, N. Y., has just presented a bill in the New York Legislature which provides for a State Sewerage and Water Commission of three members, to be appointed by the Governor for five years each, and each to receive a salary of $8,000 a year. One of the board would be a competent hydraulic engineer, and one a competent sanitary engineer and bacteriologist. The bill would appropriate $15,000 a year for permanent subordinates, and would allow something for the temporary employment of engineers, chemists, etc., provided the total annual expenditure did not exceed $75,000.

Among other things, the Commission would be required, like the Massachusetts State Board of Health, to pass upon all plans for water-supply and sewerage systems; it would have sanitary control of the water-supplies of the state, with semijudicial powers, and it would be required to investigate all typhoid fever epidemics, and after investigation, if necessary, compel any city or town to change its water-supply or sewerage system to suit the ideas of the Commission.

The *Engineering News*, in an editorial (Jan. 28, 1904), states

that "the intimate relation between the usual work of the state boards of health and that of the proposed commission is strongly in favor of reorganizing the former and increasing its powers," rather than increasing the number of commissions. This opinion is borne out by the history of the defunct State Sewerage Commission of Connecticut, and "the returns now being secured in New Jersey for the $20,000 a year which is being paid as salaries to the members of two sewerage commissions."

Some of us believe that if the State Board of Health of New York were enlarged so as to consist of two physicians, one hydraulic engineer, one sanitary expert and one lawyer, all compensated for their actual services, and that if this augmented board were given some of the power which the Stewart Bill would give the new commission, and ample means to engage the best obtainable sanitary experts and health officers, it would take a rank worthy of New York, and consistent with the excellence of sanitary conditions which should be expected of such a prosperous state.

THE FOURTH REPORT OF THE ROYAL COMMISSION ON SEWAGE DISPOSAL.—This report treats of the question of shellfish contaminated by sewage. It is a progress report only, and the commissioners admit their inability to define the conditions of pollution and their own lack of power to remedy them. It is stated that the appearance of the contaminated shell fish does not differ from that of the healthy ones, nor is bacteriology at present of great service in these cases. It is proposed to establish what is called "A Sanitary Coast Guard Service," to gradually eliminate the sources of pollution by insisting upon proper sewage disposal methods.

PURIFICATION OF HIGHLY COLORED TROPICAL WATERS (Chadwick and Blount, Proc. Institute C. E., December, 1903).—This paper treats of the purification of waters from Mauritius, Uganda and the West Indies. These waters, so loaded with vegetable matter that they are unfit to drink, are changed by thorough aeration into drinking waters of excellent quality.

CHEMICAL PURIFICATION OF DRINKING WATER.—In Europe at the present time much attention is being given to the so-called

chemical purification of water; that is, purification by means of ozone, chlorine, bromine, etc. It is undeniably true that water can be purified with these methods. The chief objection to them is that as yet they are ill adapted to large supplies. Their chief use at present has been for military purposes. The plant established at Wiesbaden for the purification of water by means of ozone has been abandoned (Arch. f. Hyg., Hyg. Rundschau, and Central b. f. Bakteriologie, Abt. I, Bd. XXXIV, No. 6). Some recent investigations show that some of the processes are much less efficient than was first supposed.

Typhoid Fever in American Cities.—Reports of typhoid epidemics appear in the press with alarming frequency. Following the epidemics at Ithaca and Butler, comes the report that in Pittsburg between December 1st and 26th there were 496 cases of typhoid. In December, 1902, there were 108 cases. On January 4th of this year it was reported that there were about 100 cases at Kittaning (population 3,902 in 1900), a town located on the Allegheny River above Pittsburg. Philadelphia reported 131 cases for the week ending December 26th, and at present severe epidemics are in course at Columbus, O., and Leadville, Col. The bad social economy of allowing these preventable epidemics to exist should be realized by every municipality.

Air in House of Commons (W. Atkinson Butterfield, *J. of Hygiene*, 3 (4), 1903, 486–497). The author made a number of analyses of the air in the Debating Chamber of the House of Commons during 1902-03. The following were the results obtained:

	Volumes Carbon Dioxide in 10,000 Volumes of Air.		
	Max.	Min.	Mean.
Air supplied to the Chamber,	3.74	3.14	3.37
Air at breathing level in the body of the Chamber,	5.23	3.35	4.59
Outgoing air from about 6 inches below the ceiling of the Chamber,	5.60	4.82	5.27

TYPHOID FEVER EPIDEMICS. — George A. Soper (Engineering News, Dec. 24, 1903, also Jan. 21, 1904), has compiled the leading typhoid epidemics, of which the following is a brief summary:

Date.	Place.	Populations.	Cases.	Deaths.
1879.	Caterham, Eng.,	5,800	352	21
1885.	Plymouth, Pa.,	8,000	1,104	114
1889–90.	Lowell Mass.,	77,696	858	65
1890–91.	Lowell, Mass.,		1,997	152
1889–90.	Lawrence, Mass.,	44,654	693	53
1890–91.	Lawrence, Mass.,		1,099	84
1893.	Worthing, Eng.,	16,606	1,411	168
1893–94.	Grand Forks, N. Dak.,	6,000	1,245	96
1897.	Maidstone, Eng.,	33,820	1,928	150
1903.	Ithaca, N. Y.,	13,000	1,300	78
1903.	Butler, Pa.,*	18,000	1,270*	56*

*To Dec. 17, 1903.

Officers and Men.

1862–63.	U. S. Army,	460,000	29,666		7,092
1898.	U. S. Army,	107,973	20,738		1,570
British Army, Bloemfontein, 2½ months,		230,000	60,000	(circ.)	8,000

While the most of the above are directly traceable to impure water, it is still to be noted in many cases, especially where typhoid fever has occurred in armies, that much of the disease was caused by secondary infection.

It should also be noted that if the typhoid excreta had been disinfected the degree of the epidemics would have been greatly reduced. Physicians cannot be urged too strongly to be sure that all typhoid excreta are disinfected; disinfection should be performed regardless of the sanitary engineering precautions which a state, city or town may have instituted. Typhoid is a contagious disease.

REDUCTION OF NITRATES BY SEWAGE AT BELFAST, IRELAND. — E. A. Letts, R. F. Blake and J. S. Totton. (Brit. Association

Advancement of Science, Southport, 1903. *Journ. Soc. Chem. Industry*, 1903, p. 1206.)

The discharge of untreated sewage at Belfast causes enormous growths of green seaweed (Ulva latissima) which washes ashore and putrifies. The growth is caused by the nitrogenous fertilizing constituents of the sewage. Experiments with potassium nitrate and septic tank effluent, showed that the nitrate is decomposed, free nitrogen and sometimes nitric oxide being evolved. The oxygen in the nitrate appears either wholly or partly as carbon dioxide.

The production of free nitrogen in contact beds is probably due to the fact that when the beds are in contact with air they become charged with nitrates and then when the sewage is introduced the latter are decomposed. The decomposition of the nitrates is caused by certain micro-organisms and not by enzymic or chemical action, as sterilized effluents were found to have no effect on the nitrates.

Experiments with *B. coli communis* and *B. lactis ærogenes* which in pure broth cultures caused the production of hydrogen, showed that in nitrated broth *B. coli communis* liberates nitrogen from the nitrates. It should be stated for comparison that when a water containing nitrate is seeded with algæ, growth occurs and nitrogen is evolved.

SANITARY SECTION OF THE BOSTON SOCIETY OF CIVIL ENGINEERS. —The first meeting and dinner of the Sanitary Section of the Boston Society of Civil Engineers was held at Hotel Nottingham, February 3. The topic discussed by the meeting was the septic tank. F. A. Barbour of Boston opened the discussion, and was followed by G. A. Carpenter of Pawtucket, George Bolling of Brockton, X. H. Goodnough and H. W. Clark from the State Board of Health, L. P. Kinnicutt and H. W. Eddy of Worcester, C. E. A. Winslow of the M. I. T., and F. H. Snow of Boston. The discussion was very able, and very broad in its scope. (See *Engineering News*, Feb. 11, 1904.)

The new Sanitary Section has been formed under the auspices of the Boston Soc. C. E., for the purpose of bringing together

those—not necessarily health officers or engineers—who are in any way interested in the design, construction or operation of sewage and garbage disposal plants, the cleaning of cities, and, in general, the employment of the sanitary acts other than, those strictly medical.

Meetings are to be held quarterly. The next meeting will discuss the general topic of the "Care of Sewers." All persons interested are asked to join this Section. The annual dues are five dollars. Application blanks may be procured from the Clerk, W. S. Johnson, Assistant Engineer, Massachusetts State Board of Health, State House, Boston.